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A USEFUL TYPE OF LIGHT, WATERPROOF CAST

Preliminary Report

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THE story of the use of splinting materials from the earliest records of the Egyptians three thousand years ago down to the present era of the plaster-of-Paris bandage is a fascinating one. This paper, however, can give only the high lights. It is of particular interest to find that the Egyptians used a combination of beeswax and rosin.[1] The natives of India, it is recorded, secured excellent results with clay molds.[2] Hippocrates was apparently familiar with rosin and wax.[3] The European surgeons of the eighteenth and early nineteenth centuries preferred splints made from cloth saturated with albumen.[4]

The first attempt to devise lighter and less bulky splints was made about 1834, when Seutin quoted by Gamgee[5] began using starched bandages. Monro[6] credits Cheselden, Larrey and Dieffenbach with achieving the first adaptable use of plaster of Paris by making molds of a correctly reduced fractured limb in a wooden box. Matthysen[7] was the first to think of impregnating coarsely meshed cotton cloth with powdered plaster, about 1852. At first this form of splint competed strenuously with starched bandage, then with dextrin, gutta percha and sodium silicate; it gradually won over all competitors through the manufacture of better cotton material or cotton cloth. Certain alterations and additions of a chemical nature — for example, salt and acetic acid — have produced changes in the setting time of the plaster, but generally speaking little if any change has taken place in the character of plaster-of-Paris bandage during the last twenty years.

Industrial chemistry has in recent years been producing in ever-increasing volume new and most interesting synthetic resins or "plastics." The opportunity to test the value of such materials for forming a rigid bandage or cast first presented itself to the authors in February, 1937. Dextrin and gelatin bandages have been used extensively to form semirigid bandages. Celluloid and pyroxylin products have been used both to make casts and to waterproof plaster. But these mediums have been generally abandoned because of their inflammable or explosive character. Certain instances are on record of fire's occurring in a celluloid-coated cast, ignited by static electricity. Shellac has been used to coat plaster, but takes days to dry. Cellulose-compound casts were made about five years ago by Dr. Peirce H. Leavitt,[8] of Brockton, but the material at that time had the disadvantage of being too coarse and too inflammable. It is of interest that our attention was attracted to synthetic resins, and that we have returned to a material somewhat like that which the Egyptians used over three thousand years ago.

Our interest in developing a light, waterproof rigid cast was aroused through the following case. The patient, a young man, had suffered a comminuted Colles's fracture with a fractured cuneiform. He was a fancy diver on the Harvard diving team, and was extremely anxious to continue his training during immobilization. It was thus necessary to construct a waterproof cast which would immobilize his wrist and be strong enough to withstand the stress of diving.

We followed Leavitt's original suggestion, and found that the makers of cellulose products had developed a very hard, light, waterproof material for making box toes for shoes. The important discovery had recently been made that adding boric acid to the cellulose compound rendered it but little more inflammable, *when dry*, than wood. The hard box toes were produced by molding a fabric impregnated with this compound while it was moistened with a solvent. Using this somewhat crude material, a very satisfactory cast was constructed for our patient, and was worn daily in the water for five weeks.

It then became of interest to see whether this

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Figure 1. *Bilateral fractures of the carpal scaphoids in a young man, twenty-one years of age. Cellulose-compound "cock-up" casts.*

material could be supplied in a form in which it could be rolled on as readily as a wet plaster-of-Paris bandage, and be used for other types of casts. Numerous trials were carried out by impregnating various fabrics with the compound; that is, flannel strips, woven bandage, crinoline,

Figure 2. *X-ray of case shown in Figure 1, taken through the casts.*

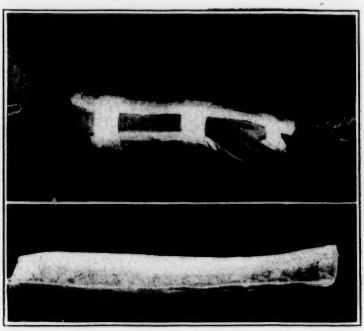

Figure 3. *Fracture of both bones of the forearm just above the wrist in a child, seven years of age, showing splints molded from cellulose-compound bandage.*

felts with scived edges and cotton cloth. The present most acceptable product is rolled, tinted, unbleached cotton sheeting, cut on the bias in 2- and 3-inch widths and supplied in 10-yard lengths. These bandages, correctly moistened with the quick-drying solvent, are supplied in hermetically sealed cans.

The casts made from this material are far

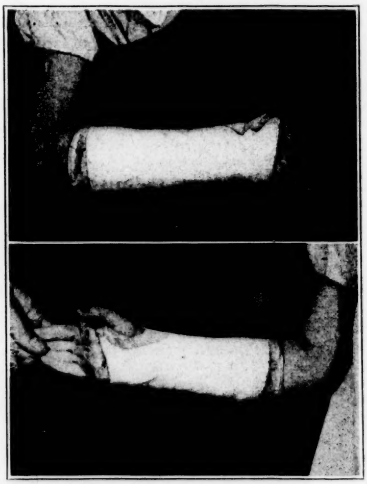

Figure 4. *Fracture of both bones of the forearm in a child, six years of age, showing cylindrical cast of cellulose-compound bandage.*

Figure 5. *Model of cylindrical cast in which wire has been inserted for "banjo" traction.*

lighter than plaster, extremely hard, waterproof, and pervious to x-ray. A much smaller quantity is required to provide rigidity than is the case with plaster of Paris. The cast does not, however, harden so quickly, taking on the average thirty to forty minutes to harden sufficiently for the patient to be dismissed, and a longer time before it cannot be indented.

We have used this material to make numerous casts; it was convenient to handle and was well liked by the patients. Its lightness and waterproof character are its salient advantages. On account of its lightness it has been used to make numerous casts for the upper extremities, both molded and circular, for fractures of the carpal bones, Colles's fracture and fractures of both bones of the forearm, and to make three shoulder spicas for fractured humeri. It has been particularly comfortable when applied to the figure-of-eight retainer in cases with fractured clavicles. Where waterproofness is desired, it has been found most satisfactory for double leg spicas in children. We have employed it on a number of toe-to-groin cylinders and leg boots and in conjunction with Bohler walking irons. One of us (A. T.) has had 4 patients swimming daily while wearing these casts. In arthritic patients they have been found most applicable. The light weight enables the patient to turn comfortably in bed, and the cast can be worn in the whirlpool and Hubbard baths. Our associate, Dr. R. J. Joplin, has used this material to

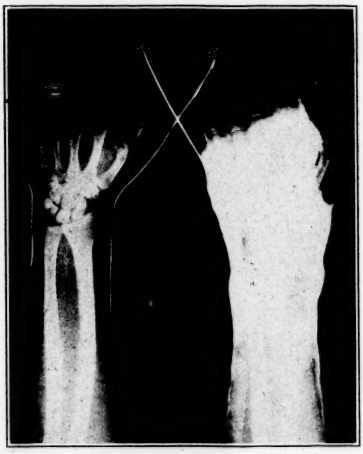

Figure 6. *X-ray taken through model shown in Figure 5, and a similar model made of plaster of Paris. Both models were exposed on the same film at the same time. Note the difference in permeability to x-ray.*

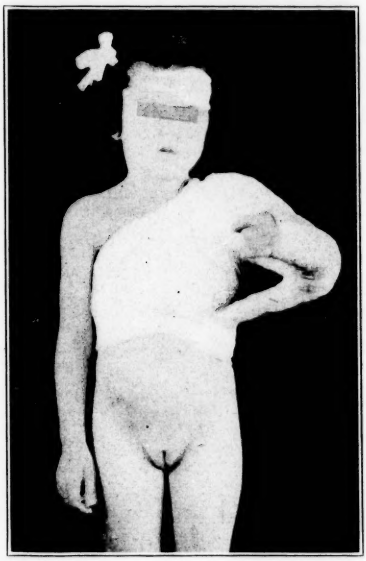

Figure 7. *Fracture of the surgical neck of the humerus in a child, six years of age, after reduction; put up in a shoulder spica of cellulose-compound bandage.*

construct jackets for painful arthritic spines (lightness being the advantage), to splint osteomyelitis cases, and to wedge deformed knees. We have utilized it for numerous protective devices for athletic injuries where lightness, great strength and waterproofing were in demand. Stitching may be done through the bandage with leather-working tools. Knee braces, shoulder and chest protectors and Thomas collars have been made. One forearm cast protecting a fractured carpal scaphoid was worn through two football games in heavy rain.

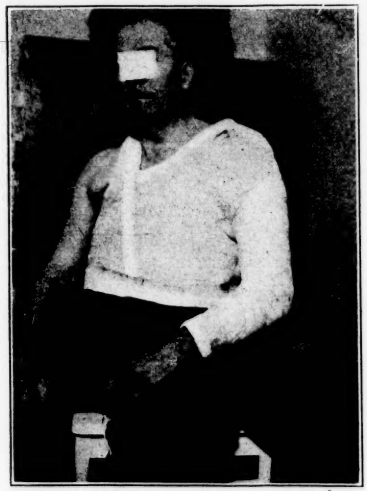

Figure 8. *Shoulder spica for a refracture through the middle third of the left humeral shaft after operative reduction in a man, sixty-two years of age.*

The method of application of the bandage, which is applied in either cylindrical-cast or molded-splint form, is similar to that adopted with plaster-of-Paris bandage, except that only three thicknesses are required; in certain areas of long or bulky casts, however, additional reinforcing slabs or circular layers may be required to counteract stresses or strains. This product has one outstanding advantage: should the cast crack at any point it is not destroyed, but can be mended with additional lacquer (solvent) and bandage. The mended bandage is as strong as the original, or even stronger. The incorporation of wire or steel (banjo wire or Bohler iron) results in a stronger bond between the parts than that when plaster of Paris is used. As stated, the bandage is packaged with the proper amount of solvent so that it cannot dry. There is no dripping when the cast is applied, the whole process being a singularly clean one. The surgeon's hands may be protected from the collodion-like film by rubber gloves; the film readily flakes off later in any case.

In applying the casts, drying will be facilitated by laying three thicknesses of gauze bandage over

Figure 9. *X-ray of case shown in Figure 8, taken through the spica and clearly showing bone repair and callus.*

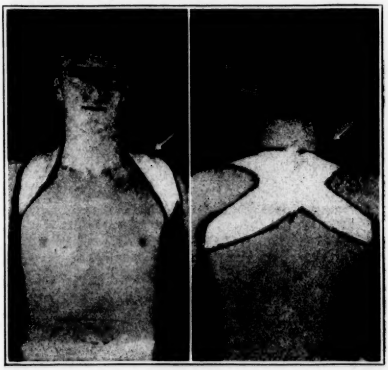

Figure 10. *Fracture of the left clavicle in a young man, twenty-one years of age, put up in a figure-of-eight retainer made of cellulose-compound bandage.*

the skin, or by using stockinet. Sheet wadding may be used, although drying is not quite so rapid, on account of the slower evaporation of the solvent from the inside layer. The main factor required in drying is ventilation, and unless the

Figure 11. *X-ray taken through the cellulose-compound bandage shown in Figure 10.*

material used for padding permits the access of air to the inside layer, the setting time is unduly prolonged. Cotton wadding may be substituted for the bandage or stockinet after the cast has been split or the molded splints have been removed for the first time. The danger of applying the cast too tightly and not allowing for shrinkage should be emphasized; this danger has been

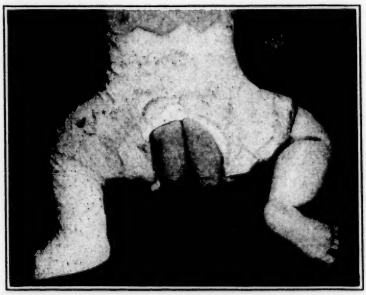

Figure 12. *Small infant with congenital hip, put up after reduction in a cellulose-compound hip spica.*

minimized by providing an impregnated cloth cut on the bias. Owing to the rapid evaporation of the solvent it is advisable to open but one bandage can at a time. Lamination may be prevented by painting the cast with some of the cellulose acetate lacquer (supplied in separate cans) the day after its application.

To acquire the technic of applying this type of cast takes practice and experience. One could scarcely expect the first application to be any more perfect than that of plaster-of-Paris bandage.

The method of removal differs slightly from that used with plaster-of-Paris bandage. Cutting, bivalving or complete removal may be accomplished with the ordinary commercial type of plaster-cutter (Stille or Zimmer), or with a sharp knife having the arc of the usual surgeon's knife. A pointed plaster knife is unsatisfactory. When the cast is cut with a keen tool, a strip of thin, pliable metal, a throat stick, or a similar object should be inserted between the cast and the skin so as to

Figure 13. *Fracture of both bones of the leg, middle third, in a child, five years of age, put up in cast of cellulose-compound bandage.*

avoid cutting the patient. A one-quarter inch strip of felt, applied when the cast is put on and lying along the site at which it will later be cut, will give similar protection. Owing to inherent factors in the hardened cellulose type of cylindrical cast, notably its resiliency in the horizontal plane or the plane in which the bandage is wound on, it is seldom necessary to cut the cast on more than one side for removal.

In reporting on a new type of rigid bandage, it is only fair to emphasize its disadvantages as well as its merits. Many patients object to the sickening odor of acetone present when the bandage is still moist. This odor disappears as drying or hardening takes place; adequate ventilation will mini-

mize it and will also shorten the hardening time. Since this product began to be supplied in hermetically sealed cans, thus eliminating the necessity for exposure of acetone in an open basin, those applying the material have noticed much less odor.

Another objection is that the setting time is long. The chemical substances that are known to lessen this period are too explosive and too dangerous to be considered. We have especially in mind propylene oxide. Efforts are now being made to solve this problem. Yet even a setting time of as long as forty minutes does not preclude the use of this material, either for freshly reduced fractures, or in the convalescent stage of bone repair, or under other conditions requiring fixation.

Figure 14. *Models of leg casts: left leg, cellulose compound; right leg, plaster of Paris.*

Those familiar with the use of pyroxylin, "airplane dope," and similar products maintain that they shrink cloth so rapidly and completely that they could not be employed in a fixative bandage of this type. Our answer is that we have minimized shrinkage — (1) by using a special pyroxylin containing only 12 per cent nitrogen (instead of the ordinary 16 per cent); (2) by adding boric acid; and (3) by selecting a fabric cut on the bias, which permits the cloth to take up the shrinkage while drying.

The fourth objection is inflammability. This cannot be denied; however, the addition of boric acid and the employment of pyroxylin containing only 12 per cent nitrogen have greatly reduced the inflammability. When the casts are thoroughly dry, that is, on the day after their application, they are no more inflammable than is wood. Sealing the moistened bandage in cans makes storage as safe as that of ether, and much safer than that of bottled collodion. The bandage is inflammable when wet, but much less so than collodion or ether; and it may be handled more safely than either.

The constituents and physiochemical properties involved are of interest. The hardening principle is entirely different from that of crystallization in plaster-of-Paris. Colloidal chemistry is involved, and hardness is achieved by evaporation with its gradual formation of millions of films in and around the fabric. The rigid bandage contains pyroxylin, boric acid and acetone. The boric acid, which is soluble in acetone, forms through the films myriads of particles which effectively diminish combustion. Twelve-per-cent-nitrogen pyroxylin is less inflammable than ordinary collodion, and the final product is less dangerous than the modern x-ray film. The development of a pyroxylin of low viscosity makes it possible to include a large volume of pyroxylin in a given amount of plasticizer or solvent, and thus allows a tremendous film-forming concentration, which permits extreme rigidity.

No skin irritation has been observed in casts made of this bandage, many of which are applied or worn next the skin. No irritation would be expected from the individual constituents. Collodion is used therapeutically on irritated skins (treatment of poison ivy, herpes zoster, and so forth), and so is boric-acid powder. Acetone is an important part of Scott's solution, used to prepare skin and mucous membranes for operation.

At present the method appears to be most suitable for the convalescent care of fractures. The slower hardening renders its use in acute fractures more difficult, although not impossible. The material's being pervious to x-ray is an advantage in the fluoroscopic room, and later in following the progress of bone healing by callus formation. Much less bandage is required to supply the desired rigidity than is the case with plaster-of-Paris, and this makes the cost comparable to that of a plaster cast.

SUMMARY

A preliminary report is given of a useful type of material for making rigid casts. It is rolled or molded in similar fashion to plaster-of-Paris bandage. When dry it is waterproof, very light, ex-

tremely hard, and pervious to x-ray. Four possible objections to it have been cited; in every instance they are found to be of relatively slight importance, none precluding the use of this type of cast in conditions requiring a fixative bandage.

We are indebted to the industrial chemists Stanley Lovell and Gardener Pratt and to the research laboratory of the Arden-Rayshine Company for their co-operation.

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THE SURGICAL TREATMENT OF ABDOMINAL FISTULAS

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ABDOMINAL fistulas are uncommon complications of abdominal conditions, but still occur frequently enough to merit a consideration of their cause, origin and method of treatment. They may originate in any part of the gastrointestinal tract, from the biliary system, from the pancreas or from the genitourinary tract. We present a study of fistulas arising from the small and large intestine, together with reports of illustrative cases, including a case of pancreatic fistula in which the patient was successfully operated on by one of us (F. H. L.). We have purposely omitted from this group of cases all biliary, urinary and duodenal fistulas, since we believe that a report of these cases should comprise a separate study.

During the past ten years at the Lahey Clinic we have examined, and advised operation on, 37 patients with fistulas arising from the intestinal tract (Table 1). Of these, 27 were submitted to operation. During this period were seen many other cases of fistula in which operation was thought inadvisable or unnecessary. During the past year (1936) we have examined and operated on 6 patients, with a complete eradication of the fistula in all cases.

This group included a wide variety of ages; the youngest patient was two years old and the oldest seventy-six. Twenty-three patients ranged from thirty to sixty. Twenty-two were men and 15 were women.

Fecal fistula commonly results from sloughing of the bowel wall from severe infection; it may also be caused by injury to the adjacent loops of the bowel during an operative procedure. Severe trauma to the abdomen may be the primary cause of a fistula, and the case of pancreatic fistula reported in this paper is an example of this. The primary cause of the fistula in our 37 cases is shown in Table 2.

Table 1. *Cases of Abdominal Fistula Arranged According to Year of Examination.*

YEAR	NO. OF CASES	NO. OPERATED ON
1927 (Apr.-Dec.)	2	2
1928	1	1
1929	1	1
1930	4	0
1931	2	0
1932	5	5
1933	2	2
1934	5	3
1935	6	4
1936	6	6
1937 (Jan.-Mar.)	3	3
Total	37	27

The commonest cause of abdominal fistula is infection which produces gangrene and perforation of the bowel. In our series, appendicitis, diverticulitis of the colon and regional ileitis accounted for 23 of the cases. When the cecum was the point of origin, the fistula usually resulted from a direct extension of an appendicular infection to the cecal wall and was caused by sloughing of the wall from a severe fulminating infection, which produced gangrene. This occurred in 10 of the cases in which the primary condition was

Table 2. *Cases of Abdominal Fistula Arranged According to Etiology.*

ETIOLOGIC FACTOR	NO. OF CASES
Appendicitis, perforated	10
Diverticulitis of sigmoid, perforated	9
Regional ileitis, perforated	4
Pelvic operation (other than for tuberculosis)	4
Pelvic operation (with tuberculosis)	2
Carcinoma of colon	3
Trauma to abdomen	2
Gastric operation	2
Richter's hernia, ileum	1
Total	37

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appendicitis. Diverticulitis of the sigmoid flexure of the colon with perforation and formation of abscess was the cause of most of the left-sided abdominal fistulas; in 9 patients the fistula was of this origin. In each of these cases the history was clearly that of diverticulitis, with formation of a fistula after drainage of an abscess in the left lower part of the abdomen. On the other hand, when the small intestine was involved the fistula more commonly followed a secondary operation for pelvic abscess or for intestinal obstruction, and frequently it was caused by trauma to the small bowel. In 6 cases in which a pelvic operation had previously been performed, an injury to the small bowel or to the rectosigmoid resulted from difficult operative procedures, and in each case the operation was complicated by serious adhesions resulting from previous surgery. Regional ileitis must always be seriously considered as a cause of a right-sided abdominal fistulous tract, and in most cases in which the fistula is found to arise in the terminal ileum it proves to be the result of a localizing ileitis of this type. We have operated on 15 patients with regional ileitis, of whom 4 had fistulas which arose from a perforation of the ileum. With one exception all these had been referred to us after what was thought to have been an operation for a perforating appendicitis. Four other cases in which the fistulous communication entered the small bowel apparently resulted from trauma; 2 of these followed gastric operations, 1 was caused by an injury to the ileum in a hernial sac, and 1 followed a severe injury to the abdomen. Fistulas of the colon infrequently follow contraction of a colonic stoma, as in a series of 135 Mikulicz resections of the colon for carcinoma only 3 persistent fistulas have occurred subsequent to closure of the temporary stoma. This complication is most often associated with an improper secondary closure of the stoma, and is caused by an obstruction to the passage of the intestinal contents through narrowing of the lumen of the bowel at the level of closure. We have had but 1 case of persisting pancreatic fistula, and this originated from traumatic rupture of the pancreas, caused by injury to the abdomen received while playing football. The case was successfully managed by transplantation of the fistula into the jejunum.

Figure 1. *Filling defect in the terminal ileum with moderate stasis and distention proximal to defect may be noted; the cecum also shows involvement with this inflammatory process.*

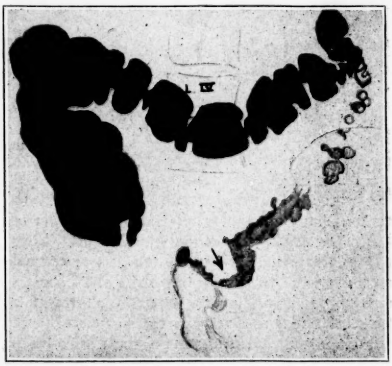

Figure 2. *Diverticulosis and diverticulitis of colon. The arrow points to irregular constriction caused by diverticulitis. After the colon was emptied multiple diverticula were demonstrated.*

The discharge of fecal material through an opening in the abdominal wall establishes very clearly the diagnosis of a communication with the intestine. The source of a discharge, nonfecal in character, also may be determined readily, since the fluid can be identified by simple laboratory procedures, as in our case of pancreatic fistula. The history may be of great assistance in establishing the part of the intestine involved; if it is studied in detail the origin of the fistula can be determined in

most instances. A complete history frequently gives more accurate information as to the origin of the tract than does the roentgenologic examination; nevertheless, the latter should always be made, so as to establish the presence of obstruction, which is so often present, and also to indicate the pathologic condition involved. A roentgenologic examination made after injecting lipiodol into the fistulous tract will aid in determining the origin of the tract. It is necessary that the surgeon visualize as accurately as possible the condition underlying the fistula, so that he may plan the scope of the surgical procedure needed to eradicate it. As pointed out previously, regional ileitis may have been the primary cause of a persistent abdominal discharge; if such is the case a much more radical operation will be required, and this must be planned for preoperatively. The case of a woman of twenty-three, with a fecal fistula of two years' duration, illustrates this well (Fig. 1). Two operations had been previously carried out elsewhere for closure, in the belief that the fistula arose from a perforated appendix. The roentgenogram revealed a typical picture of regional ileitis, for which resection of the terminal ileum and ascending colon was necessary in order to obtain a cure. Needless to say, such an operation is a highly technical procedure, and involves a much greater risk than a simple closure of an opening into the cecum. Roentgenologic examination will also reveal the condition resulting from a diverticulitis of the colon, the presence or absence of obstruction and the presence or absence of fistulas in other viscera, and will assist materially in the planning of a sound surgical method. Following a severe inflammatory process in a colon which is studded with diverticula, the bowel is often thickened and stenosed from scar tissue, and this cicatrization and stenosis are likely to be permanent. The diverticula are readily outlined by a barium contrast enema, and the point of obstruction can be clearly seen (Fig. 2).

Table 3. *Cases of Abdominal Fistula Arranged According to Duration.*

DURATION	NO. OF CASES
1 to 6 mo.	13
7 mo. to 1 yr.	7
2 yr.	6
3 yr.	3
4 yr.	3
5 yr.	1
6 yr.	0
7 yr.	1
8 yr.	2
17 yr.	1
Total	37

In our series the duration of the fistulas varied between two months and seventeen years; 24 patients had had an abdominal discharge for more than six months, and 1 had had a discharge for seventeen years (Table 3).

It is true that a fistula of the cecum or of the small bowel is not usually a serious complication in the majority of cases, and most such fistulas tend to close without a major operation; this is particularly true if there is no obstruction of the bowel. Because of this we have carefully eliminated from our study many of the fistulas that occurred after operation for perforated appendicitis, and those which occurred after cecostomy or enterostomy had been carried out, in which healing resulted within

Table 4. *Data on Twelve Cases of Abdominal Fistula with a Duration of Less than Six Months.*

AGE AND SEX	DURATION mo.	CAUSE	REASON FOR OPERATION	OPERATION	FINAL RESULT
42 F*	2	Multiple pelvic operations	Fibroid uterus; subovarian abscess; fistula	Hysterectomy; salpingo-oophorectomy	Fistula healed spontaneously 2 mo. after operation
37 M	3	Perforated appendix	Symptoms of obstruction	Operation advised; did not come in	Healed spontaneously 1.5 yr. later
34 M	3	Gastric operation	Jejunal fistula; jejunocolic fistula	Resection of jejunum	Died; peritonitis
35 F	2	Operation for drainage of pelvic abscess	Bilateral subovarian abscess	Hysterectomy; salpingo-oophorectomy	Persistent fistula 3 yr. later
39 F	4	Perforated diverticulitis of sigmoid	Obstruction of sigmoid	Resection of sigmoid	Cured
50 F	2	Perforated diverticulitis of sigmoid	Obstruction of sigmoid	Resection of sigmoid	Cured
42 M	3	Trauma of abdomen; enterostomy	Chronic intestinal obstruction	Resection of ileum	Cured
52 F*	2	Multiple pelvic operations	Fibroid uterus	Hysterectomy, with fistula resulting	Healed spontaneously 2 mo. after operation
72 M	3.5	Perforated diverticulitis of sigmoid	Operation advised against because of age	None	Persistent fistula
67 M	2	Perforated appendix	Chronic intestinal obstruction	Resection of ileum and cecum	Died; pneumonia
37 M	3	Regional ileitis with perforation	Regional ileitis	Resection	Died; peritonitis
18 M	3	Trauma of abdomen; ruptured pancreas	Draining pancreatic fistula	Transplantation of fistula into jejunum	Cured

*Fistula occurred after operation at the clinic.

Because of this we have carefully eliminated from our study many of the fistulas that occurred after operation for perforated appendicitis, and those which occurred after cecostomy or enterostomy had been carried out, in which healing resulted within

a few weeks. In such cases, provided no accompanying pathologic change can be demonstrated, the wound closes spontaneously and operation is unnecessary. We have included only the cases in which the fistula was permanent and in which there was no tendency of the lesion to heal spontaneously. Twelve patients, however, are included who had had fistulas for six months or less, most of whom required operation for relief. Table 4 presents these cases briefly and explains the necessity for operation.

If the more conservative measures, such as strapping with adhesive tape, cauterizing the edges of the openings, and simple closure with buttons (Fig. 3), do not result in cure, more radical operation is indicated. The operation for relief in these cases may be a serious one; it frequently taxes the ingenuity of the most experienced surgeon and calls for the highest degree of surgical judgment and skill. The operative technic must be planned for each case, and frequently the method of attack can be determined only as the condition is revealed at operation. The surgeon must in most cases anticipate an extensive procedure, must expect that a painstaking dissection will be necessary to eliminate the fistulous tract, and must guard against gross contamination of the peritoneal cavity from the spilling of intestinal contents or infected draining fluids. One of the more serious problems is the sterilization of the skin, which is almost impossible, and the prevention of local infection or peritonitis, since sterilization of the surrounding tissues cannot be satisfactorily obtained. Fortunately, in individuals who have had long-standing abdominal infections a marked local immunity develops and these wounds tend to heal readily without the development of serious inflammatory processes.

Another problem of importance is the determination of the presence of an intestinal obstruction. In practically every one of our cases one or more attempts at operative closure had already been made elsewhere. Failure had resulted because the problem of obstruction was not recognized. If the inflammatory process and scarring has produced marked narrowing of the intestinal lumen, this must be relieved. In many cases resection is necessary, and in such instances, particularly in the small bowel, we prefer to re-establish the intestinal lumen by closing the resected ends and performing a lateral anastomosis. It is our opinion that a lateral anastomosis in the presence of obstruction is safer than and preferable to an end-to-end anastomosis, because of the disproportionate size of the hypertrophied proximal intestinal loop, which does not lend itself readily to an end-to-end anastomosis with the collapsed distal segment. A simple short-circuiting operation in these cases is unsatisfactory unless the fistulous tract is removed. If it is not, the fistula will continue to discharge either because of reverse peristalsis or because only a portion of the fecal current has been diverted.

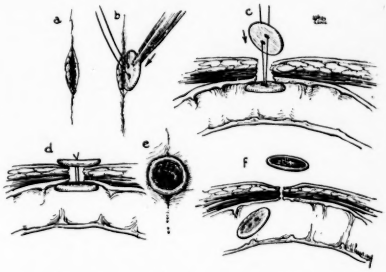

Figure 3. *Closure of fistulous opening with button technic. The opening is enlarged by incising, and an ordinary bone button is threaded on silver wire, introduced through the opening into the bowel, and anchored in place by tying a second button over the external opening.*

When obstruction is associated with a fistulous tract communicating with the large bowel we prefer to employ a Mikulicz type of resection in addition to the excision of the tract, because of the greater margin of safety associated with this type of operation. This is especially true in the sigmoid flexure, where a high degree of obstruction frequently accompanies diverticulitis with an associated fistula. It must be emphasized also that in order to obtain permanent closure the tract must be completely excised, the thick, irregular, indurated edges of the opening into the bowel being entirely removed, and only relatively normal bowel wall being sutured. If the opening into the bowel is small, closure may be obtained by simple suture; otherwise, provision for restoration of an adequate lumen must be made.

Two methods of attack are useful in the eradication of fistulous tracts, one extraperitoneal and the other transperitoneal. Very few fistulas can be removed satisfactorily by extraperitoneal closure, even though this is the safest method and should be used whenever possible. This is particularly true of a fistula of the small intestine, because there is usually either a kinking of the intestine, or a narrowing of the lumen, which by obstruction leads to the persistence of the fecal

discharge. If the communicating sinus does not penetrate deeply into the abdominal cavity it may be removed without a wide opening into the peritoneal cavity. By far the larger number of cases require free, wide incision of the abdominal wall, a thorough release of adhesions, and open dissection of the tract, so as to obtain good exposure and protect the unaffected viscera with abdominal pads. If the tract can be followed throughout its course by the induration and thickening of its walls, the opening in the skin may be closed after complete dissection of the tract, leaking and contamination of the surrounding tissues thus being avoided. Traction upon the dissected part often outlines its direction. In some cases it is necessary to pass a probe along the course of the fistula as a guide in dissection.

The variety of methods of dealing with abdominal fistulas can be illustrated best by presenting 6 successfully treated cases, and describing the operative method employed in each case.

CASE REPORTS

*Case 1.** A man, aged 54, entered the New England Deaconess Hospital on December 1, 1936, for treatment of a fecal fistula in the right lower quadrant, which had

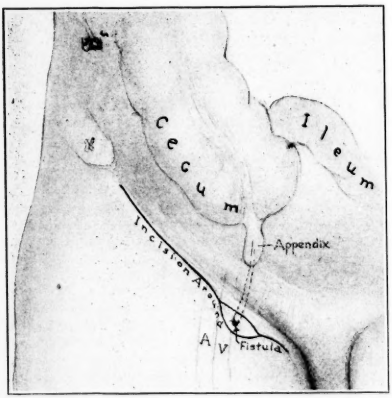

Figure 4. *Reproduced by courtesy of Surgical Clinics of North America (17:791, 1937). Location of the fistulous opening and the incision used in the operation are illustrated. The relation of the cecum and the appendix to the fistulous tract is demonstrated.*

been present for one year. A femoral hernia on the right side had been repaired elsewhere in 1922; in 1927 an abscess developed in the operative scar, which opened and drained for 7 weeks, complete healing taking place after the discharge of a fecalith. In 1934 drainage was instituted for a gangrenous appendix; at this time the scar of the femoral hernia again opened and purulent material drained; both wounds healed after 10 weeks. A fecal fistula developed in the scar of the femoral hernia about 1 year before the patient was admitted to the clinic.

Physical examination revealed a draining fistula in the center of an oblique scar just below Poupart's ligament (Fig. 4). Roentgenologic examination after injection of lipiodol revealed a large sinus, apparently connected with the large bowel.

At operation, December 3, an oblique incision was made parallel to and below Poupart's ligament, encircling the

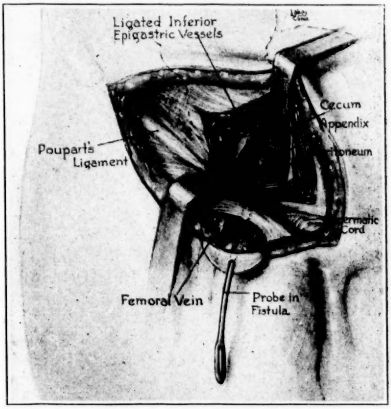

Figure 5. *Reproduced by courtesy of Surgical Clinics of North America (17:793, 1937). The operative dissection is illustrated. The tract has been cleanly dissected from the femoral vein and is shown entering the stump of the appendix. Adequate exposure of the appendix and cecum is obtained by incising the fibers of the aponeurosis of the external oblique muscle and retracting the internal oblique and transversalis muscles. The peritoneum is opened, but the operation is extraperitoneal because adhesions adequately protect the main peritoneal cavity.*

fistulous opening in the skin. A probe was inserted into the sinus as a guide, and the tract was dissected free from the femoral vein up to the femoral ring (Fig. 5). An incision was then made above the inguinal ligament through the aponeurosis of the external oblique muscle, the internal oblique and the transversalis muscles were retracted, and the peritoneum was opened. The deep epigastric vessels were divided between ligatures so as to give better exposure. The cecum with the appendix was easily identified, and was found to be well walled off with adhesions from the general peritoneal cavity, so that the latter was not opened. The tract was completely dissected, and the appendix, which opened directly into the tract, was removed and the stump carefully inverted. The femoral opening was then closed by suturing Poupart's ligament to Cooper's ligament. The muscles and fascia of the abdominal wall were closed in layers and a drain was placed in the region of the femoral canal. The patient was discharged 23 days after operation with only a slight seropurulent drainage from the wound. On February 27, the wound was entirely healed.

*Cases 1, 2 and 3 have been reported elsewhere (Marshall, S. F.: The surgical management of fecal fistula. S. Clin. North America, 17:787-801, 1937).

This case illustrates a fecal fistula arising from an appendix. The history points accurately to the appendix as the source of the fistula. In this case we were able to excise the tract and close the opening in the cecum without opening the general peritoneal cavity, which materially reduced the operative hazard.

Case 2. A man, aged 44, entered the New England Deaconess Hospital on February 27, 1937, because of a hernia in the right groin. At the age of 7 he had been ill subsequent to the development and drainage of an abscess in the right inguinal region. The sinus had drained for

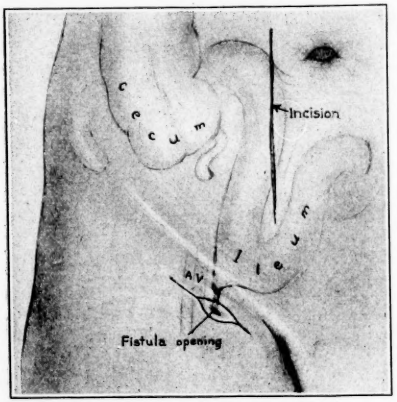

Figure 6. *Reproduced by courtesy of Surgical Clinics of North America (17:795, 1937). Fistulous tract entering terminal ileum through femoral canal is demonstrated. The locations of the incisions are shown. This fistula followed a Richter's hernia of the small bowel.*

a long time but finally healed. He had had no further trouble except for a hernia in the right groin. One week before admission tenderness and induration had developed in the groin. An opening formed in the scar through which fecal contents drained.

Physical examination revealed a draining fecal fistula opening over the femoral canal just below Poupart's ligament. Palpation revealed the presence of a femoral hernia; gurgling of the intestinal contents beneath the skin was easily demonstrated. A diagnosis was made of a fecal fistula probably arising from a Richter's hernia of the small bowel.

At operation, the abdomen was opened through a right paramedian incision (Fig. 6), and the terminal ileum 15 cm. from the ileocecal valve was found to be adherent on its antimesenteric border to the sac of a femoral hernia. The fistulous tract entered the bowel; it was excised from the intestinal wall. The opening into the ileum was closed transversely and the lumen was not narrowed. The hernia was then repaired from within the abdominal cavity and the abdominal wall was closed without drainage. An oblique incision was made below and parallel to Poupart's ligament, the draining sinus was freed from the femoral vein by careful dissection, and the entire fistulous tract was removed. This incision was closed without drainage. Recovery was uneventful and the patient was discharged 21 days after operation, when there was only a slight serous drainage from the inguinal incision.

This case illustrates a transperitoneal approach to a fistula of the small bowel which arose from a Richter's hernia of the terminal ileum into a femoral sac.

Case 3. A woman, aged 36, entered the New England Deaconess Hospital on February 13, 1937, because of a draining abdominal sinus of 4 years' duration. In 1919 an abdominal operation had been performed for a tuberculous abscess. The patient was confined to bed for 8 months and made a slow recovery. In 1933 an operation was done for a fibroid tumor and a second pelvic abscess was drained. After this operation the patient was confined to bed for 13 months. An abdominal fistula had persisted since that time. Undigested food was discharged from the fistula 2 or 3 hours after ingestion. The patient had had attacks of severe lower abdominal pain every 1 to 3 weeks, and these were followed by increased drainage from the fistula. Constipation had always been a marked feature.

Examination of the thorax did not reveal any evidence of tuberculosis, nor did the roentgenogram. There was a fecal fistula in the midportion of the suprapubic scar, and a fixed mass, adherent to a normal-sized uterus, in the right side of the pelvis.

At operation, the midline suprapubic scar with its fistulous tract was excised and the peritoneum was opened. The pelvis was filled with adhesions, and the sigmoid flexure and rectum were densely adherent to the uterus. A firm, fixed mass filled the right side of the pelvis, and a probe passed through the fistula entered this mass. The left tube and ovary had been previously removed. After a painstaking dissection a supravaginal hysterectomy was done, and the right tube and ovary, which comprised the mass on the right side, were removed. The fistula entered the ileum, which was scarred and partially obstructed. The fistula was excised and the intestinal opening was closed, but this produced so much narrowing of the lumen of the bowel that it was necessary to perform an anastomosis between the terminal ileum and the transverse colon. A drain was inserted into the pelvis through the abdominal wound because of the marked degree of secondary infection present, although this procedure was considered undesirable because of the diagnosis of tuberculosis. The drain was removed within a few days. The patient made an uneventful convalescence and was dismissed 26 days after operation, at which time there was a slight serous drainage from the lower end of the incision. This drainage persisted for 6 months. Dr. Shields Warren reported that the specimen showed tuberculous endometritis, tuberculous oöphoritis and tuberculous salpingitis.

This case is an excellent example of a fistula following a secondary operation for drainage of a pelvic abscess, and probably resulted from marked inflammation involving the wall of the ileum. An extensive operation involving much difficult dissection was necessary in order to remove the involved pelvic organs and to excise completely the fistulous tracts. The closure of the small bowel together with an already existing partial obstruction necessitated an enteroanastomosis.

*Case 4.** A man, aged 18, came to the clinic on January 22, 1936. Three months previously he had been kicked in the abdomen while playing football. An ab-

*This case has been reported in detail elsewhere (Lahey, F. H., and Lium, Rolf: Cure of pancreatic fistula by pancreatojejunostomy. Surg., Gynec. and Obst., 64:79-88, 1937).

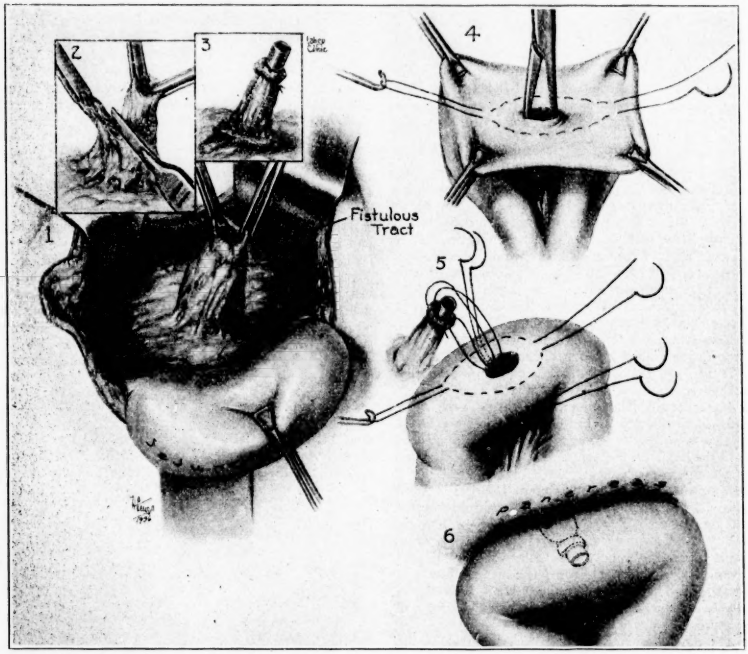

Figure 7. *Reproduced by courtesy of Surgery, Gynecology, and Obstetrics (64:78, 1937). Steps used in pancreatojejunostomy. (1) Fistulous tract to the pancreas cored out from the abdominal wall. Note the defect remaining on the right side of the incision where the tract was cored out. The jejunum has been brought up over the transverse colon preparatory to implanting the tract in it. (2) Paring the thick wall of the tract down to its base. In doing this, special care must be exercised lest the walls of the tract be pared too thin, perforated, and the tract spoiled. (3) The prepared fistulous tract with a short section of catheter tied into it so that the purse-string suture by which it is to be buried into the jejunum will not occlude it. Note the cuff of scar tissue left at the base of the tract, to be attached to the jejunum to prevent the bowel's pulling away while the fistula is healing into the jejunum. (4) The method of preparing the opening into the jejunum for the implantation. The best opening with the least bleeding is made by forcing a closed sharp-pointed goiter hemostat through the jejunum after the purse-string suture has been inserted, and with the jejunum held in intestinal forceps. As here shown, this opening, with little or no bleeding, can be dilated by the forceps to any size desired. (5) Two silk sutures which catch the end of the fistulous tract and are passed into the opening in the jejunum and out close to the mesentery. These traction sutures make it possible to guide the tract into the jejunum, which even then is not an easy procedure. With the tract well inserted into the jejunum, the purse-string suture is tied snugly about the neck of the fistula; with the tube in it, obstruction will not result. The fine silk guide sutures emerging through the wall of the jejunum are now cut and withdrawn. (6) The cuff of scar tissue left at the base of the fistulous tract is now fixed to the wall of the jejunum by interrupted silk sutures front and back to prevent escape of the fistulous tract from the bowel, and the operation is completed.*

dominal exploratory operation had been done elsewhere 2 days after the accident, when a hemorrhage into the gastrocolic omentum was revealed. A drain was inserted and the fluid from this drain proved to be pancreatic juice. Drainage continued for 7 weeks, when the patient left the hospital. The following day the fistula reopened. On December 30, 1935, roentgenologic examination elsewhere revealed a cavity to the right of the midline and about halfway between the anterior abdominal wall and the spine, which was about 11 cm. in oblique diameter and 5 cm. in vertical diameter.

On examination at the clinic it was found that the abdominal incision was healed; in the upper third of the scar there was a fistulous opening which was discharging clear, opalescent fluid. A catheter was inserted into the sinus tract in order to collect and measure the fluid and to avoid leakage. Roentgenologic examination after lipiodol and sodium iodide had been injected revealed a

cystic cavity about one fifth the original size. Because of this reduction in size it was decided to pursue a conservative course of treatment. The patient entered the hospital, laboratory studies were made, and medical treatment was instituted. When the patient left the hospital the sinus had shrunk to the diameter of the inlying catheter. Because pancreatic juice continued to be discharged and because the patient wanted to be rid of the fistula, we decided to transplant the fistula into the jejunum. For 3 weeks before operation the fistula was gradually dilated from the size of a 14 to that of a 22 French catheter.

On March 16, 1936, 5 months after the original accident, a pancreatojejunostomy was done by one of us (F. H. L.). Spinal anesthesia was used. An incision was made around the fistulous tract and the peritoneal cavity was opened about 5 cm. below the opening of the sinus. All layers were dissected through the peritoneum, first to the left and then to the right of the fistula from below. The fistulous tract passed between the stomach and the transverse colon, and was well surrounded by omentum. It was dissected back toward its base about 5 cm., and was cored away until it was only about 1 cm. in diameter. A 22 French catheter was tied into the sinus with silk, to prevent occlusion of the canal after its implantation (Fig. 7). A loop of jejunum was brought up, and with a Babcock clamp on each corner of a rectangular area opposite the mesentery a straight clamp was punctured through the wall of the jejunum. The blades of the clamp were separated, the opening was dilated, and a purse-string suture was placed around this opening and left free. A silk stitch was placed on each side of the end of the fistula. These stitches were then brought through the wall of the jejunum and were used to draw the fistula into the jejunum. This maneuver was executed with considerable difficulty. The purse-string suture was then tied, and a row of interrupted catgut sutures was placed between the omental neck of the fistulous tract and the jejunum. Finally a continous suture was placed between the omentum and jejunum. At the end of the operation the fistulous opening could be felt well within the jejunum, and there was no encroachment on the lumen of the jejunum. The abdomen was closed without drainage, using interrupted silk through-and-through sutures.

Convalescence was uneventful except for slight sepsis of the wound, which had cleared up entirely by the 12th day after operation. The patient left the hospital in good condition on the 17th day after operation. He has remained well and free from symptoms.

Case 5. A woman, aged 39, entered the clinic on February 16, 1934, because of draining abdominal fistulas. Operation had been performed elsewhere on October 11, 1933, following an attack of pain and tenderness in the left lower part of the abdomen. A perforated diverticulum had been found, and apparently resection of the sigmoid flexure with an end-to-end anastomosis had been done. Fecal drainage immediately followed this operation, and on January 12, 1934, an attempt was made elsewhere to close the fistulas, but without success.

Examination revealed three draining fistulas in a left rectus scar. Roentgenologic examination after injection of the fistulous tracts with lipiodol showed that they communicated with the sigmoid flexure of the colon. Examination after a barium enema had been given revealed the presence of numerous diverticula of the colon and a region of narrowing at the level of the fistulous tracts.

In order to divert the intestinal stream, a transverse ileostomy was performed on February 19. Twenty days later the abdomen was opened widely and the fistulous tracts were excised. A Mikulicz type of resection was necessary to remove the affected part of the sigmoid flexure. Convalescence was uneventful and the wound healed satisfactorily. The stoma in the ileum was closed on May 11, and 13 days later a plastic closure was done on the stoma in the sigmoid flexure. Healing without drainage resulted after 13 days. Examination 6 months after operation showed complete healing, and the patient was in excellent health.

The operation for eradication of fistulas arising in the left portion of the colon is likely to be a highly technical procedure. In most cases resection is required, and occasionally the diverticulosis may be so extensive that the continuity of the bowel cannot be re-established and the patient is left with a permanent colonic stoma. The possibility that a permanent opening will be required should always be considered, and the patient should be so advised before operation is undertaken. Occasionally, if no obstruction is present, the operation may be simple, consisting of an extraperitoneal closure of the openings in the colon and simple excision of the tracts. We have been able to do this in 2 cases in which the fistulas originated from diverticula.

Case 6. A woman, aged 22, was admitted to the clinic on March 3, 1937. Appendectomy with drainage had been done in January, 1935, because of pain and tenderness in the right lower quadrant of the abdomen. Fecal discharge through the appendectomy wound soon followed this operation, and it had persisted. A second operation was performed 6 months later in an attempt to close the fistula, but without success. The fistula had continued to drain; the patient had lost weight, and had had attacks of vomiting and recurrent pain in the right lower part of the abdomen.

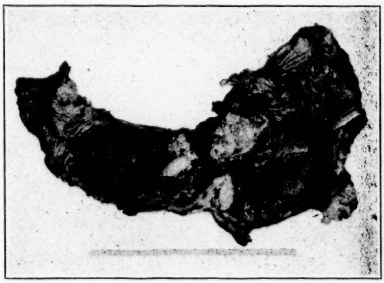

Figure 8. *The terminal ileum is thickened, edematous and congested. Marked ulceration with almost complete obstruction of the terminal ileum may be noted. This ulcerative process extended to the cecum, and the fistulous tracts communicated with the ileum.*

Examination showed an undernourished patient. Two draining fistulas were found which opened into the midpart of an oblique scar in the right lower part of the abdomen. Roentgenologic examination revealed a moderate filling defect in the terminal ileum, with mild ileal stasis and distention proximal to this defect. The tentative diagnosis of regional ileitis was made.

Operation was performed April 7, 1937. The old scar with the fistulous opening was excised and the abdomen was opened. The terminal ileum was thickened, edema-

tous and congested; this process extended to the cecum, and the fistulous tracts communicated with the ileum (Fig. 8). A Mikulicz type of resection was done, removing 27 cm. of the ileum, together with the cecum and the ascending colon (Fig. 9).

The postoperative course was uneventful. The Mikulicz spur was divided before the patient left the hospital. Six weeks later she was readmitted to the hospital and the stoma was closed; 14 days following this closure she was dismissed, with the wound entirely healed.

It is evident that regional ileitis preceded the development of this fistula, perforation occurring after appendectomy had been performed. Failure to recognize the condition readily accounts for the unsuccessful attempt at closure. The history and examination strongly suggested regional ileitis, and we were fully prepared for the major operative procedure. In cases of regional ileitis a perforation may either occur into adjacent loops of bowel, or produce an external fistulous opening. This condition should always be considered as a source of a fistula in the right part of the abdomen. It is obvious that any attempt at extraperitoneal closure of these tracts is doomed to failure. The best results, in our experience, for the control of the ileitis as well as the eradication of the fistula are obtained by resection of the affected loop of bowel. In a series of 15 cases of regional ileitis, resection was performed in 9 cases without a death.

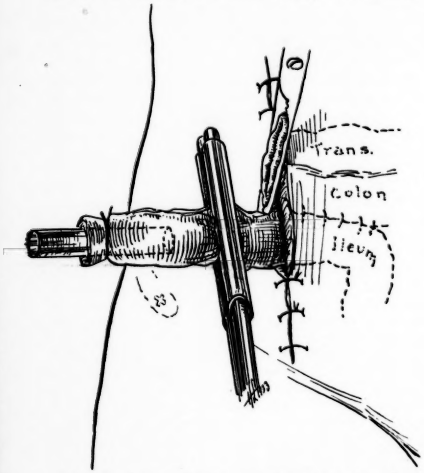

Figure 9. *Reproduced by courtesy of New York State Journal of Medicine (34:135, 1934). Method of resection, illustrating the Mikulicz type of resection of the terminal ileum and ascending colon. The transverse colon and terminal ileum are brought through the abdominal wound, forming the Mikulicz stoma. The ileum is staggered so that a drainage tube can be tied within the lumen and immediate drainage of the small bowel obtained.*

In our series of 37 cases of abdominal fistulas, 27 patients were submitted to operation; 5 died after operation, an operative mortality of 19 per cent. Ten others were advised to have an operation but refused. Of the 27 patients operated on, permanent closure of the fistula was obtained in 19 (Table 5). Serous material but no fecal contents continued to drain from the fistula in 2 cases in which there was an associated tuberculosis of the pelvic organs. Both of these patients were much improved in health following operation.

It is of interest to review the pathologic changes in the 5 cases in which death occurred following operation. In 1 case peritonitis occurred following an extensive operation for repair of a jejunal fistula associated with a jejunocolic fistula, which had developed after multiple gastric operations had been performed. These cases are serious problems; peritonitis is one of the most dreaded sequelae, and is the cause of death in most instances. It occurred in another case after operation for a fistula which had formed after an appendectomy. At operation numerous external and internal fistulas were found and an extensive resection of the bowel was necessary. Death occurred on the third postoperative day. Pneumonia accounted for a fatal outcome in a man of sixty-seven who on admission had had an intestinal obstruction complicating a long-standing fecal drainage. Another death followed operation on a patient who had regional ileitis; an ileocolostomy was performed because of his poor condition, but death from inanition resulted three months after operation. In the fifth case death occurred at home two months after dismissal from the hospital, at which time the patient apparently was in good condition; the cause of death is unknown.

Table 5. *Operated Cases of Abdominal Fistula Arranged According to Result.*

RESULT	NO. OF CASES
Complete cure	19
Persistent fecal drainage	1
Died following operation	5
Drainage (tuberculosis); no fecal drainage	2
Total	27

SUMMARY

A study of 37 cases of persistent abdominal fistulas is presented. The pathologic condition involved in their production is discussed.

The method of determining their origin and the reason for their persistence are outlined. Many operations for closure of abdominal fistulas result in failure because the underlying pathologic condition has not been recognized.

A general discussion of the principles involved in the surgical treatment is given. The operation is a serious one, and in most cases requires extensive technical procedures.

Six cases of fistula are reported, together with the operative method employed for the eradication of the fistula in each case.

Of 27 patients who submitted to operation, com-

plete closure was obtained in 19. Any operation designed to eradicate these fistulas is likely to be extensive, and because of this carries with it a high mortality (19 per cent).

Discussion

Dr. Lahey: There are two or three important points to emphasize in connection with this paper. One is the value of the button method. We did not originate this idea. I found it somewhere in the earlier literature. If you have not employed buttons, you will do well to remember that they will save lives in occasional cases of duodenal or jejunal fistula. We now have a patient who had a gastroenterostomy, then a gastrojejunal ulcer, which was removed. He then had a jejunostomy, and following the establishment of a jejunal fistula he lost weight at the rate of about 1 lb. a day. We were in despair as to how to save his life, because he was losing weight so rapidly that we could not think of operating. We split the sinus tract, introduced an ordinary bone button on edge with a silver wire threaded into its holes, put another button on top, and brought them together by twisting the silver wire. This controlled the fistula well enough so that the patient immediately began to regain his weight. At the end of two weeks we cut the wire and let the button pass, and the fistula immediately closed. Several times buttons have saved our patients' lives.

Another matter that I wish to stress is regional ileitis. This paper has, I think, covered all the points regarding fistulas, but I urge that everyone keep in mind the question of regional ileitis. It is occurring constantly. When this paper was first begun, we had had only 15 cases; we have now had 23. I did a resection in such a case day before yesterday. The history is so typical in most of the cases that we should not make many mistakes in diagnosis, nor should we delay until the typical roentgenologic findings of a rigid terminal ileum are found.

Most of these patients have had repeated attacks of pain, usually resembling those of appendicitis. Many have had their appendices removed, but the trouble still continues. The history is one of right-sided pain, often with colic and fever, and usually associated with attacks of diarrhea. Late in the disease, the ileum shows definite stiffening, but early it may not be easy to bring out the typical roentgenologic picture of ileitis. Certainly in all the patients who have so-called appendicial symptoms associated with diarrhea, particularly with each attack, we should consider regional ileitis. Conservative operations for this condition are unwise. They leave the lesion untouched, they permit feces to run through the incompletely obstructed segments, and they tend to produce secondary fistulas. We have performed resections in 15 cases, with no mortality and with excellent results. In the cases in which a lateral anastomosis was made, complications occurred, and there tended to be fistulas into the other segments of the bowel; so that this procedure seems unsatisfactory.

Dr. H. Gildersleeve Jarvis, Hartford, Connecticut: As regards duodenal and biliary fistulas, we have had 2 cases sent to us for operation. These patients had had a continuous fistula since their original operation. Each fistula was thought to have been caused by severance of the common duct. In both cases, however, operation revealed a stone in the common duct just distal to the cystic duct, and its removal caused the fistula to clear up entirely. If the common duct has been cut, exploration of the fistula frequently reveals the condition, and at some future operation the ends can be re-joined.

In abdominal fistulas that arise from the gall bladder or the intestinal tract, the first thing to determine is where they originate. We had 1 case in which an abdominal fistula arose from the appendix and came to the surface in the right renal region. The removal of the appendix effected a complete cure.

Dr. Ernest M. Daland, Boston: A case of actinomycosis of the large bowel with persistent fistulas came under our care last year at the Massachusetts General Hospital; the patient was a girl of sixteen who had been operated on two years previously for a ruptured appendix. Following this she had had a persistent fistula. A second operation had been done, following which there were two fistulas. There was a third operation, and when we saw her, about 2 years after the first operation, she had five or six fistulas. We examined the pus from the discharge and inoculated guinea pigs with it, but could find no organisms. We made a special search for actinomycetes. The patient developed a subphrenic abscess and a psoas abscess, both of which we drained successfully. The sinuses persisted, and all connected with the psoas space. We then did an anastomosis of the ileum and transverse colon, with some improvement, and the girl was sent home. She returned with a persisting fistula, whereupon a right-sided colectomy was done. In the specimen, the pathologist found one area of actinomycosis, which was the basis of the final diagnosis. After the colectomy the patient did quite well for two weeks; then the blind end of the transverse colon opened and there was again drainage through the psoas wound. We administered large quantities of iodides, and improvement began. Two weeks later she developed an acute obstruction, and in spite of all we could do, she died. No autopsy was obtained.

Dr. Marshall: It is worth noting that most of the cases we have reported were referred to us after several attempts had been made to close the fistulous tract. We must recognize the underlying lesion if we are to be successful in the management of these cases. Extraperitoneal operations will rarely accomplish closure of this type of fistula. This is particularly true of fistulas arising from the sigmoid as the result of a perforated diverticulum. These patients must be warned that operation may be difficult, and in many instances must be told they may be left with a permanent colonic stoma. The reason for the latter is that frequently in the eradication of the fistula and the accompanying lesion for relief of the obstruction, it may be necessary to remove so much of the sigmoid that re-establishment of the intestinal canal cannot be done.

EARLY DIAGNOSIS OF SCHIZOPHRENIA BY THE GENERAL PRACTITIONER

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THE difficult problem of the treatment of schizophrenia (dementia praecox) has recently aroused considerable attention because of the claims set forth for new therapeutic technics. In this way facts of pronounced social significance concerning this disease have been brought to light. Outstanding among them is the revelation that most patients suffering from this disorder are brought to hospitals at an astonishingly late stage.

The incidence of schizophrenia is low as compared with that of diseases not directly associated with the brain. Pollock[1] states on the basis of the Federal Census of 1920 that the average annual rate of dementia praecox first admissions per 100,000 population during that year was 18.6 for males and 16.4 for females. On the other hand, there is a comparatively low spontaneous remission rate. Fuller[2] has followed a group of 600 male and 600 female schizophrenics for fifteen years after their first admission. He reports that at the end of that period 38.4 per cent are still in hospitals, 25.0 per cent have died and 36.6 per cent have been discharged. It is to be noted that of the total discharged patients only 12.4 per cent were considered recovered. These figures bring out a condition of great importance, both economic and social; namely, the disease is characterized by a low recovery rate, so that patients tend to accumulate in hospitals. There is also a moderate infiltration of the general population with partially recovered individuals who make a definite contribution to the crime and disease rates, and also to the incidence of problem behavior in children.

The effects of this infiltration cannot at present be computed, but the results of accumulation in hospitals can be. In the Massachusetts state hospitals in 1936 schizophrenics comprised 15.9 per cent of total first admissions, while they accounted for 39.0 per cent of the first-admission resident hospital population. Similarly, during that year only 23.1 per cent of the patients readmitted to hospitals were schizophrenic, but 62.3 per cent of hospital residents who had been readmitted were so diagnosed.

On September 30, 1936, the total number of schizophrenic patients in the Massachusetts state hospitals was 12,212. The per capita cost was estimated at $7.75 per week. Consequently the direct annual cost of these patients, leaving out of account the loss in earning power, amounted to approximately $5,000,000.[3]

The incidence of schizophrenia in the general population will be shown more vividly if we realize that it first begins to appear at the approach of puberty. From then on the curve soars rapidly to reach its crest at about the thirtieth year. It then subsides gradually until the fiftieth year, after which practically no cases appear. Furthermore, the incidence among the rural population is much less than that among city-dwellers. Pollock and Nolan[4] report that this rate in the urban population of New York State from 1915 to 1920 was 19.1 per 100,000 population, while in the rural communities it was 7.8. There is a slight tendency, represented by the ratio 113:100, for schizophrenia to appear in men more frequently than in women.

Reducing these figures to terms of everyday experience, one may expect that most of these patients will come to the general practitioner not from schools but from factories, stores, universities, transportation services, the professions, and other fields of work in which young men and women begin their careers. A fair number of cases will follow the first few pregnancies and so occur during early married life. A limited number of patients will come from farms and from groups in other outdoor occupations.

The influence of heredity is extremely difficult to gauge. It is still unusual to find reliable records for several generations, and it is almost impossible to ascertain whether abnormalities in the offsprings of schizophrenics are due to inheritance or to the environment created by the parents. There is, however, general agreement that from the point of view of the healthy development of children such environments are undesirable.

RELATION OF DURATION OF ILLNESS TO THERAPEUTIC RESULTS

The therapeutic attack waged for decades on this disease has been active but relatively unsuccessful. Procedures have recently been developed for which much is claimed. Proof of such claims is still lacking, and their validation has been made even more difficult because a considerable number of schizophrenic patients come to hospitals late; as a result, their condition is relatively hopeless and comparable to that in cancer after metastases have developed, or to that in pulmonary tuberculosis after cavitation.

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During the last several years one therapeutic method after another has been proposed; in each instance it has been emphasized that considerably better results have been obtained in early cases. The production of long-continued sleep, introduced by Kläsi[5] and since modified by many workers, is reported by Favre[6] to have little success in cases of long standing. Meduna,[7] who recently brought out a method of treatment whereby convulsions were produced through the intravenous injection of metrazol, states that the first six months of the disease constitute by far the most favorable period; this is borne out by Friedman,[8] who introduced the method in this country. Sakel,[9] and the numerous workers who have used his treatment, consisting in the production of insulin hypoglycemia, have emphasized that there is a close relation between the duration of the illness and the outcome of the treatment. Good results are claimed when the cases are of less than six months' duration. The outlook is still hopeful when the duration is less than eighteen months, but thereafter the likelihood of a favorable outcome rapidly lessens. Dussik[10] in a recent article even insists that delay within the first six months in itself renders the treatment more difficult and the outlook more dubious.

PRESENT STATUS OF SCHIZOPHRENIA ADMISSIONS

Those who are developing new methods of treatment in Massachusetts state hospitals generally agree that the great majority of patients who might have benefited come to the hospital in an advanced stage of illness. Hospital records have repeatedly shown that individuals have been clearly recognized as mentally sick even by laymen for years before hospital treatment was sought. From March, 1936, to February, 1937 (inclusive), 197 cases of schizophrenia were admitted to the Worcester State Hospital. Of these, 32.4 per cent had shown symptoms for six months or less, 17.5 per cent for between six months and two years, and 48.1 per cent for over two years. This delay in hospitalization is also clearly shown by the following figures, based on first admissions to the New York Civil State Hospital[1] in 1925:

AGE GROUP	AVERAGE DURATION OF SYMPTOMS BEFORE ADMISSION (YEARS)
15-19	.7
20-24	1.5
25-29	1.7
30-34	2.0
35-39	2.7

The delay is partly due to the reluctance of families to have their members enter a state hospital; it is also partly due to the obstacles to early diagnosis, and to the difficulty experienced by the general practitioner in obtaining a clear picture of the early symptomatology.

EARLY SYMPTOMS

Early symptoms vary to some extent with the age at which the disorder begins. In the younger age groups there are two fairly well-divided trends. One is the gradual development of schizophrenia in a person who has from childhood been an odd, aloof individual, or one who has shown many behavior problems, such as long-continued enuresis, temper tantrums, sulking and emotional instability. There is frequently a gradual accentuation of personality trends for years, the first recognition of the illness coming with the appearance of frank delusions. The second trend is the sudden appearance of odd, perhaps dramatic, behavior in a person who has been under recent stress. It may take many forms: stupor, or states of ecstasy, or suicidal attempts, or bizarre exhibitionism. Infantile traits, such as bed-wetting and refusal to eat unless actually fed, may appear. Usually accompanying this condition are considerable confusion and inability to concentrate. In the older age groups the onset is often more insidious. Four groups of early symptoms require special notice: withdrawal, loss of capacity, emotional dulling, and tendency toward misinterpretation.

Withdrawal. In this condition, the patient who may hitherto have enjoyed good social relations, both at home and in his work, gradually becomes less approachable. His family observe that he goes out less frequently, no new friends are made, and old acquaintances are gradually dropped. The patient appears to become dull; his social relations lose some of their warmth. Interests and hobbies claim his attention to a decreasing degree, and he spends a considerable part of his time in daydreaming. Occasionally the patient makes active efforts to secure solitude. Even less frequently he realizes that he is drifting away from contact with everyday affairs, and tries hard to recover his old ability to be interested and to form friendships. Noyes[11] states that in the patient who is ". . . . usually poorly endowed in warmth and spontaneity there is a decrease both in desire and attempts to express the personality." Yellowlees[12] lays great stress upon withdrawal from reality, and believes that this symptom will be found in almost every adequately studied case of schizophrenia.

Loss of Capacity. Among the earlier symptoms is a gradual failure to deal with everyday tasks of work and living. This, too, may be recognized by the patient, and he may complain that he has lost the capacity to concentrate or that he has lost his former energy. More often his friends first comment upon it and refer to his having lost

his ambition and his interest in life. Rosanoff[13] refers particularly to lack of interest, and to the slothfulness with which friends and relatives often charge the patient. The failure in capacity in some cases is not of the general nature just described, but is revealed in periodic exhibits of poor judgment and in inability to grasp situations.

Emotional Dulling. The majority of investigators of the early symptoms of schizophrenia lay considerable stress on emotional disturbances. These are predominantly of the nature of dulling, though occasionally moodiness or outbursts of irritability may be present. The dulling may show itself simply as part of the syndrome already mentioned under withdrawal. The patient appears to be quite uninterested in what is going on; even matters of great importance may serve to arouse no interest, or a mere show of interest. A further aspect is the relative inscrutability which such patients present to the observers. It is exceptionally difficult to feel in tune with them, for not only have ordinary daily events lost their significance, but matters which seem trivial to the average person begin to acquire special meanings and special emotional importance for the patient. Kretschmer says aptly that it is as though a sheet of glass stood between the observer and the patient. This simile is capable of further extension, for not only is it difficult for the observer to feel in touch with the patient, but it is apparently no less difficult for the patient to keep himself in emotional rapport. Indeed, this symptom may first become conspicuous through the patient's revealing, contrary to his usual custom, occasional unfeeling and callous behavior in dealings with his friends. Mayer-Gross[14] has given an excellent description of this gradual loss of the finer sensibilities.

Tendency to Misinterpretation. This symptom usually appears rather later than the former three, and may be the precursor of definite delusions. In the early stages, however, the patient may, for example, simply have a feeling that people are looking at him or talking about him. The impression may at first be quite transitory, and the patient may either spontaneously or on reassurance realize that he is in error. This feeling that people are not friendly to him or are paying special attention to him may disappear when the patient goes to a new locality, and not recur for several months. Occasionally one encounters patients who, for this reason and because their illness has developed slowly, have for years moved from place to place across the country, finding a few weeks' or months' respite in each fresh environment. The tendency to misinterpret may also show itself in other spheres than that of personal relation; for instance, the patient may grow suspicious as to the purity of his food. At first these symptoms are all on an "as if" basis, the patient claiming that the food tastes as if it were not wholesome, or as if it had been contaminated by some foreign substance.

Less Common Early Symptoms. Occasionally, first complaints relate to difficulties in thinking. Difficulty in concentration has already been referred to. A less common symptom is a feeling that the patient's thoughts have suddenly vanished, so that he is unable to carry on a line of thought. Patients sometimes speak of the intrusion of thoughts which seem to them to be absurd and irritating, but which are later placidly accepted. During the early stages of this development, care must be taken to distinguish this symptom from the obsessional neurosis, as described below under differential diagnosis.

A second group of less frequent symptoms is comprised of various physical ailments. As a rule these refer either to a general feeling of weakness and easy fatigability, or to rather odd or persistent complaints in the absence of physical symptoms to substantiate them. In particular the heart, the stomach, the functions of excretion and the reproductive apparatus are singled out. As the illness progresses the complaints become more and more fixed and bizarre, so that a patient who has been concerned over alleged palpitation and weakness of his heart may declare that his heart has stopped entirely or has been transferred to the right side of his body. A final symptom, which is only infrequently found in early stages, is a sensation of unreality; the patient complains that he feels as though he were in a dream, that he does not feel normal, and that things around him, although well known to him, have lost the touch of familiarity. This symptom, when it does occur early, usually portends the rapid development of the disease.

DIFFERENTIAL DIAGNOSIS

Although the presence of any of the symptoms outlined should arouse suspicion, final diagnosis must be based on the detailed picture presented by the patient. In the early stages of schizophrenia care must be taken to distinguish it from conditions with which in its later development there would be no danger of confusion. Brain tumors, especially those located in the frontal lobes, may present a picture difficult to distinguish from that of early schizophrenia, save after an exhaustive neurological examination. Similarly, the late and gradual development of a postencephalitic Parkinsonian syndrome may, during its first stages, imitate the symptoms of early schizophrenia. This syndrome is particularly confusing when it occurs in association with personality changes in adolescence. A detailed history will usually serve to bring to light

the earlier acute illness. Other organic conditions which require consideration are epilepsy, where the attacks are light and unobserved and the changes in personality well developed, drug addiction, especially alcoholism, and the toxic states. In general the symptoms peculiar to these conditions will serve as counterpoises in the observer's judgment against those also exhibited in early schizophrenia. Mayer-Gross,[14] in considering the differential diagnosis of schizophrenia and the organic affections of the central nervous system, lays stress first on the physical symptoms which accompany the latter, secondly on the fact that, while in this group the intelligence and memory are usually more affected than are the quality of emotional responses and the ability to establish emotional rapport, in the schizophrenic the reverse is the rule.

Among the mental conditions, the disorder which is most likely to cause confusion is manic-depressive psychosis. Henderson and Gillespie[15] point out that the apathy, the listlessness, and in fully developed cases, the stupor of schizophrenia may be confused with those manifested by depression. They emphasize that, as even brief inquiry usually reveals, the listless schizophrenic has no feeling of sadness, but is often contented and desires only to be let alone. Certain psychoneuroses, particularly obsessional neurosis, and to a lesser extent hysteria, present some difficulties, the former because of the occurrence of intrusive thoughts which the patient cannot control, and the latter because of the occasional inadequate emotional responses and of the trance-like states which may cause confusion with the true catatonic stupor. The diagnosis must be made on the detailed picture presented by the early symptoms, with no one of them overstressed.

SUMMARY

The social and economic significance of schizophrenia has been demonstrated. Although the illness is one with a relatively low incidence it has great chronicity, so that ultimately more hospital beds are occupied by schizophrenic patients than by patients suffering from any other mental illness. The financial burden which this disease imposes is heavy. A significant feature is that the average patient is brought to the hospital relatively late in his illness. In many cases, when hospital treatment is begun, symptoms have been present for years. Hospital treatment has in the past offered little more hope for early cases than has care in the home. Recently, however, various forms of treatment have been brought forward, their originators and proponents emphasizing that they are much more effective in the early stages. The value of these methods has not yet been fully assessed. These conditions, and the general experience of physicians that the earlier in the disease treatment is begun, the better chance it has of proving effective, lead inevitably, however, to one conclusion — every effort must be made to promote earlier hospitalization. Since this responsibility rests chiefly on the general practitioner, we have endeavored to give a description of the earliest symptoms of which we have knowledge.

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SOCIAL SECURITY AND THE PHYSICIAN

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THE scope of the term "social security" is almost unlimited; hence, in considering the problem we should divorce our minds from the meager provisions of the Social Security Act approved August 14, 1935. The subject is much broader. President Roosevelt has summed it up well by saying, "Among our objectives I place the security of the men, women and children of the nation first." He has also said that security for the individual and for the family concerns itself with three factors: (1) decent homes to live in; (2) development of the natural resources of the country so as to afford the fullest opportunity to engage in productive work; and (3) safeguards against the major misfortunes.† My discussion, however, will be confined to those aspects of social security which impinge on the life and work of the physician.

Until today, this country has lagged far behind many others in social security legislation; but now that a beginning has been made we will, whether we wish to or not, be forced rapidly onward by reason of the ever-accelerating speed with which social rules are gathering headway in our democracy. From now on, the medical profession in all its contacts with the public will become increasingly aware of the new conditions brought about by social legislation, and be forced to adjust itself to them. We may wish with all our hearts that we could go back to the horse-and-buggy days; after all, those times had something to recommend them, but, as we have recently been so constantly reminded, those days are gone forever. We must either keep up with the march of time or be left jogging along behind. Far too many of us doctors go about our practice without realizing that while we are attending conscientiously to the task of the moment, grave issues of medical policy are every day pressing closer. In our medical journals, newspapers and magazines we read of the trend toward state medicine, the entrance of government into the care of tuberculosis, cancer, pneumonia, and so forth. But do we actively concern ourselves with the legislation, the setting up of commissions, the financing and the centers of control of these new governmental interests? We owe to ourselves, to our community, to the state and to the nation, an intelligent understanding of social security. Not only that; as doctors and as members of this medical society we should define in our minds our share in this field of medicine. For instance, it seems to be generally agreed that the bona-fide indigent should be cared for by some governmental agency. Should we not be ready to declare our stand on the methods to be employed? Should we not have a plan for improving the health of the nation by the extension of preventive medicine? Should we not formulate plans or at least a theory for financing the care of the indigent? In addition, should we not make recommendations as to where the control of this work should lie? These matters, it seems to me, are the vital concern of every one of us.

For centuries workers sought protection against sickness and its concomitant wage loss through the medieval guilds, the trade unions and a variety of mutual-aid societies. Before the industrial revolution many of the uncertainties and calamities of life were due to natural causes. With the coming of the machine age and the urbanization of populations, new uncertainties appeared, large classes of people who were without property and were earning small wages found themselves unable to meet many of the emergencies that arose. They banded together and pooled their resources, and many employers organized welfare and relief schemes.

Up to the last years of the nineteenth century, governments followed a hands-off policy. The states first encouraged mutual aid by authorizing welfare schemes and regulating contracts. The movement has in the last fifty years brought to birth thousands of mutual-aid institutions in many countries, with a total membership counted in the millions; yet in all this time only a small proportion of the working class has been enrolled. In particular those earning low wages did not join these societies, which despite their large numbers were individually quite small; they were also very unevenly distributed, being numerous in the cities and almost non-existent in rural areas.

In spite of its theoretical advantages, voluntary insurance was not sufficient; compulsory insurance was the next step taken to provide wider aid and better protection. Germany in 1883 under Bismarck, without any effective experimentation with the voluntary method, was the first to make insurance compulsory for industrial workers; in 1885 the scheme was extended to commerce and in 1886 to agriculture, so that from 40 to 45 per cent of the population of Germany is now covered by

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†President's Messages, June 8, 1934, and January 4, 1935.

this plan. In Great Britain 39 per cent is thus taken care of. Austria and Hungary entered the field of compulsory insurance between 1888 and 1891. With the beginning of the twentieth century many other countries, among them Luxemburg in 1901, Norway in 1909, Serbia in 1910, Great Britain and Russia in 1911 and Rumania in 1912, did so; at the present time twenty-nine countries have compulsory insurance.

Our first attempt to follow this system was the enforcement of insurance through the Workmen's Compensation Act. Because of public indignation, and under the forceful leadership of President Theodore Roosevelt, the first workmen's compensation law was passed by Congress in 1908, to cover laborers under federal jurisdiction. In 1911 ten states passed similar laws; by 1916 thirty-one states had compensation insurance, and in 1936 only two states, Arkansas and Mississippi, were without such laws.

As might have been predicted from the experience of Europe, the medical profession remained aloof and largely indifferent and uninformed. The laws were for the most part framed without benefit of medical counsel, and their administration was placed almost exclusively in lay hands; until 1934 only one state had a physician on its compensation commission. The New York State law, effective July 1, 1935, gives to physicians one third of the representation on the Industrial Council, which is charged with a broad advisory function in the administration of workmen's compensation.

The difficulties encountered by European nations have been repeated in a small degree in the United States. Blunders in administrative organization, excessive lay control of professional practice, inadequate medical service, unfair remuneration of medical practitioners, excessive costs and wasteful management, exploitation of commercial insurance carriers, malingering by workmen, frauds by physicians, shyster practices by lawyers, are all on record.

Our experience in workmen's compensation is well summarized by I. S. Falk. His conclusions are as follows:

> (1) The scope of the compensation law has broadened by extending the coverage to larger numbers and varieties of industries by embracing (in twelve states) occupational diseases along with industrial accidents, by expanding the variety and by increasing the duration of medical service.
>
> (2) The emphasis has to an increasing degree been shifting from the provision of cash benefits (to replace wage loss and for the purchase of medical care) to furnishing benefits in kind (medical care as a supplement to cash benefits for wage loss) although cash benefits still consume approximately twice as much money as do medical benefits.
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> (3) The worst evils in compensation medical practice in connection with the workmen's compensation act may be traced to lack of adequate professional participation in formulating and administering the laws. Some of the most serious abuses have been eliminated where joint medical and lay groups have arrived at agreements upon revised procedures.

Our next attempt to extend the principle of social security was the Social Security Act, placed on the statute books in August, 1935. This act was devised to provide some safeguard against the insecurity of modern life through co-operative action by the federal and state governments, thus making possible the fullest consideration of local economic and social problems while maintaining a national unity of program. President Roosevelt, at the National Conference on Economic Security in November, 1934, said in part:

> There is also the problem of economic loss due to sickness, a very serious matter for many families with and without income, and therefore an unfair burden upon the medical profession. Whether we come to this form of insurance sooner or later on, I am confident that we can devise a system which will enhance and not hinder the remarkable progress that has been made and is being made in the practice of medicine and surgery.

At this same conference Secretary of Labor Perkins said:

> Ill-health is a hazard which may strike at any age, and is rendered particularly distressing by the economic considerations that are involved. Through its Public Health Service the Government has for a long time accepted a certain measure of responsibility for the health of the people. That service by its preventive and educational work has played an increasingly valuable part in improving the Nation. But we cannot shut our eyes to the fact that vast numbers of our people in times of sickness are unable to pay the costs of necessary medical care. From time immemorial the members of the medical profession have cared for the needy without thought of reward. We cannot in fairness ask them to carry a burden which under the stress of modern conditions becomes heavier daily. Our problem is to bring adequate medical care within the reach of those who cannot at present afford it, and at the same time safeguard the highest interest of the profession, which has always given without stint of its service to the care of suffering and needy humanity. To this end the co-operation of the medical profession is vital, and I have every confidence that such co-operation will be accorded by the profession, which has always had such fine traditions of public service.

It appears from these two statements that the medical profession is still held in high esteem by the President and the Secretary of Labor.

The Social Security Act includes a number of distinct though related measures, which may be grouped under the following headings:

1. Unemployment compensation.
2. Old-age assistance and old-age benefits.
3. Security for mothers and children.
4. Aid to the blind.
5. Vocational rehabilitation.
6. Extension of public-health services.

We are not directly concerned with the first two and the fourth headings, but the others require some explanation.

3*A. Grants to States for Maternal and Child Welfare* (Title V, Part 1). The purpose of this act is "to extend and improve as far as practicable under the conditions in such a state, services for promoting the health of mothers and children, especially in rural areas suffering from severe economic distress." For this the act authorizes the annual appropriation of $3,800,000. The federal administrative agency is the Children's Bureau of the Department of Labor, which agency dictates the policy. As this bureau is under the direction of social welfare workers, its policy is naturally more influenced by their conception of social welfare expediency than by medical necessity. The bureau holds the purse string for the states, since all grants must be approved by it. If so approved, each state gets $20,000 and such proportion of $1,800,000 as live births in that state bear to the total live births in the United States, and $980,000 distributed on the basis of need, again taking into consideration the number of live births in the state. Except for the latter distribution each state appropriates an amount of money equal to the federal payment. Up to April 28, 1936, thirty-nine states and Alaska, the District of Columbia and Hawaii had qualified for federal grants. All state plans are aimed primarily at the education of doctors, nurses, parents and children in the care of the health of the mother and child. Several states are conducting demonstrations in a special effort to reduce maternal mortality, through maternal-health education, obstetric service for examination and consultation, and nursing service for prenatal, delivery and postpartum care. In Arizona a mobile tuberculosis unit gives diagnostic and advisory services to referred children.

3*B. Services for Crippled Children* (Title V, Part 2). This part of the act is intended to enable each state "to extend and improve, especially in rural areas and in areas suffering from severe economic distress, services for locating crippled children and for providing medical, surgical, corrective and other services and care and facilities for diagnosis, hospitalization and after care for children who are crippled or who are suffering from conditions which lead to crippling." An annual appropriation of $2,850,000 is provided. Again, the Children's Bureau dictates policy and controls administration. The language of the act is vague, and just what the services mentioned above will consist of depends entirely on the discretion of the bureau. Each state having a plan appropriate to the indicated service and approved by the Children's Bureau receives $20,000 annually, the remaining $1,830,000 to be distributed "to the states according to the need of each state as determined after taking into consideration the number of crippled children in such state in need of services." The cost of furnishing such services to the states favored with allotments must be matched by them, dollar for dollar. A year ago many states had no official agency for providing services to crippled children as a recognized public responsibility. There are now such official agencies in forty-six states; up to June, 1936, in twenty-nine of these states the agencies had been approved by the Children's Bureau. This section of the act will certainly develop state-wide programs of services to crippled children, although sundry agencies will administer them. Co-operation with the vocational rehabilitation services of the state concerned is required.

3*C. Child-Welfare Service* (Title V, Part 3). "The act is to enable the United States to co-operate with the states in establishing, extending and strengthening in predominately rural areas child-welfare services for the protection and care of homeless dependent and neglected children in danger of becoming delinquent." Ten thousand dollars goes to each state, and $996,000 is distributed annually among the states. No provision is made for the states' obligations to match these sums. This part of the act is also directed by the Children's Bureau.

5. *Vocational Rehabilitation* (Title V, Part 4). This measure authorizes the appropriation of $1,841,000 for 1936-1937, and thereafter $1,938,000 annually, to the states in order to extend and strengthen the program of vocational rehabilitation of the physically disabled. Each state is to receive, after $5000 goes to Hawaii, such proportion of this sum as its population bears to the population of the United States, no state to get less than $10,000, and each state to match this grant, dollar for dollar.

6. *Public-Health Services* (Title VI). This section authorizes an annual federal appropriation of $8,000,000, to be distributed among the states in order to assist "states, counties, health districts and other political subdivisions of the state in establishing and maintaining adequate public-health services, including the training of personnel for state and local health work." This money is distributed on the basis of (1) population, (2) special health needs and (3) financial needs. The federal administrative agent is the Surgeon General of the United States Public Health Service, and he must approve all plans before any state can receive a grant. There is also provision for an annual appropriation of $2,000,000 to the United States Public Health Service, to be used for "investigations of diseases and problems of sanitation and for the pay and allowance and traveling expenses of personnel of the Public Health Service

engaged in such investigation or detailed to co-operate with the health authorities of any state."

The success of this general program depends on the wisdom shown in developing well-balanced plans and in securing the co-operation of the many groups interested. At present there is great difficulty in finding persons well qualified to do the work. Thorough training in pediatrics, obstetrics and orthopedics is necessary, as well as a knowledge of public-health problems and procedures. Many recent medical graduates are looking forward to work in the field of public health and are taking postgraduate courses to fit themselves for it. Both the Children's Bureau and the United States Public Health Service are making an earnest endeavor to pick men who will maintain high standards and who have adequate medical background, even though they lack specific public-health training. The Social Security Act has been rushed through with such speed that time will necessarily be needed to train the proper personnel.

A letter of April 6, 1937, from the Children's Bureau, says: "To date forty-eight states, Alaska, Hawaii and the District of Columbia have approved plans for maternal and child-health services; forty-two states, Alaska, Hawaii and the District of Columbia have approved plans for services for crippled children; and forty-two states and the District of Columbia have approved plans for child-welfare services." The Public Health Service states in a letter dated April 7, 1937: "All the states, the territories of Alaska and Hawaii and the District of Columbia are participating in the program," — that is, the grants under the public-health-service section of the Social Security Act.

What part is Massachusetts taking in the functioning of the act? Maternal and child-health service is under the direction and control of the Division of Child Hygiene, and the crippled-children service is directed by the Orthopedic Unit of the Division of Administration, both of which are subdivisions of the State Department of Public Health. The child-welfare program comes under the State Department of Public Welfare.

Our crippled children in Massachusetts have been benefited to the extent of $85,000 received during the last year. Such a child is defined as "one who is under twenty-one years of age, who is suffering from poliomyelitis, bone or joint tuberculosis, congenital defects (harelip or cardiac disease), arthritis and other similar conditions that may lead to or have produced crippling and that may be treated advantageously." Eleven clinics have been established under the act — in Pittsfield, Greenfield and Springfield in western Massachusetts; in Worcester and Gardner in the central part; in Haverhill, Lowell and Salem in the northeastern area; and in Fall River, Hyannis and Brockton in the southeast. There are no clinics in the Metropolitan area. Each is in charge of an orthopedic surgeon, who gives his services for a nominal fee. The first clinic was opened in Pittsfield September 2, 1936. Through January 15, 1937, thirty-two sessions had been held; 244 children had made 298 visits, 40 had entered hospitals and 750 treatments had been given by the field physiotherapists. The patients must be recommended by their family physicians. Applications are passed upon by a committee from the local district medical society, and when approved, must be finally accepted by the orthopedist in charge of the clinic. This procedure has been approved by the Massachusetts Medical Society. Fortunately these various clinics are in charge of well-known, high-grade orthopedic surgeons.

At Worcester five or six clinic sessions have been held; the patients were all from out of town and almost entirely chronic cases or those requiring free service. I am told by the surgeon-in-charge that this work has proved well worth while. He also states that there has been little or no encroachment on private professional work. Such infringement is an obvious possibility, but with proper control of the clinics this danger is slight. This type of advance by government into medicine has been helpful rather than hampering and has met with general approval and co-operation from lay women, many of whom are giving both time and money. Through the active assistance of the medical profession such governmental activity should prove a mutually beneficial function in socializing the practice of medicine.

The other funds received by Massachusetts under the Social Security Act are used to extend the former health program, with the addition of a number of special projects — the care of premature babies, health surveys, improvement of school lunches, parent education, and research, study and community demonstrations in nutrition and public-health nursing. There is some hope that under the public-health section of the act money to extend medical education through clinics and lectures to physicians in various parts of the State will be forthcoming.

What is the future of social security? You have all received a communication from the Committee on Public Relations of the Massachusetts Medical Society, dated February 1, 1937, telling you of approaching legislation on compulsory health insurance in Congress and in our own legislature. Any such legislation is bound to affect all doctors; the issue is one between social science and medical science; the latter is fighting a lone battle, while

social science is backed by many economists, almost all social workers, and the public. Many politicians see in this broad humanitarian issue much chance for patronage and votes.

Are we in for state medicine? It is hard to see any other deduction if compulsory health insurance goes through, for under such a regime the doctor would be under direct control of those who hold the purse strings. Consider the trend of government responsibility in the care of the sick: first it was limited to the insane; next it included those with tuberculosis. Now Massachusetts takes upon itself a large responsibility in dealing with cancer, while New York does the same with pneumonia. Arthritis, cardiac diseases and rheumatism are all engaging considerable public interest. No doctor wants to care for the insane. Terminal cancer cases require so much attention that most Massachusetts doctors are glad to send them to the (politically built) Pondville Hospital, now so crowded that a second one is to be built in the western section of the State. New York has just appropriated $400,000 to type and furnish free serum for pneumonia, which will help not only the public but the medical profession. Our many veterans' hospitals are an ever-present threat that many other diseases may be given government supervision as these hospitals become less occupied by the ex-soldiers.

There is much to be learned from the experience of European countries. As already pointed out, the Workmen's Compensation Act was foisted upon the medical profession, and is only now working more smoothly because there is medical representation on the various administrative boards. Health insurance in England was established without the medical profession's having anything to say, and only recently has it had any worth-while representation on supervisory bodies. It is only fair to add, however, that recently the British Medical Society has asked to have the system extended to those with higher incomes. In Germany and many other countries the doctor has nothing to say about the regulations governing this vital medical problem. It therefore behooves the medical profession to make an exhaustive study of it. We cannot stage a sit-down strike; we must take some action other than mere negative opposition. We cannot fight this movement destructively, but must make counter proposals.

Most leading medical scientists agree with the social scientist that modern medicine is not available to the great majority of the population. It is here that we must co-operate with the social scientists. The latter interpret the problem solely as one of paying out enough money to get the necessary results, while doctors know that many people continue to prefer patent medicines and employ quacks and cultists; we also know that there is not yet enough first-class medical care to distribute, even were it possible. The profession should realize that this is one of its main weaknesses. Until the medical schools meet this challenge, regimentation by the state will only make matters worse, for before the law competent and incompetent doctors are alike. Improvement in medical education and an increase in professional ability will naturally take a long time, so that we cannot count upon them in our present scheme. We must make some compromise with the social scientist, and socialize certain medical services rather than socialize the doctor.

We must stress preventive medicine; that is, we must plan more for health than for better care for the ill. Our health policy must be national in scope, as are policies of defense and education, so that privileged and underprivileged alike will benefit; we must think in terms of the health of the entire population rather than of the illness of one part. The medical problem is only a small phase of the economic problem of low wage-earners, who form 80 per cent of the population; our attack must be on a broader front. Recent studies undertaken so as to discover the inadequacies of our present medical system show that they are more dependent upon poverty, unemployment, intemperance, superstition and inertia than upon a scarcity of doctors, hospitals or free clinics.

In order to carry out such a program we must have leadership from the federal government. If the doctor as well as the social scientist is called into consultation, we can present concrete suggestions dealing with the health of the population as a whole rather than with the illnesses of a relative few.

After thoughtful study of this subject, I wish to make the following recommendations:

1. *Preventive Medicine.* We need to emphasize prevention of disease by the marked expansion of public-health services. None of the countries where compulsory insurance is in force can show any reduction in mortality, and many countries, notably Germany and England, show a marked increase. The present venereal-disease program, stimulated by the United States Public Health Service, is a noteworthy attempt to deal early with a disease which may later cause dependency and penury. By socializing such kinds of medical service we can improve the general health.

2. *Local Tax Support for Hospitals.* We cannot continue to depend upon private philanthropy to support the hospitals caring for the indigent or low-income group. This cost should be met from local

tax funds, if possible, with state and federal aid under certain conditions and in certain communities. This may mean increasing the courtesy staff at many hospitals, but Class A medical schools now graduate students who must have a hospital connection in order to do their best work, and by selecting the right men we could improve the standard of medicine in our cities. However, if we accept federal aid for our hospitals, we cannot refuse to pay federal taxes to care for maternity cases in Oklahoma or any other state.

3. *Local Tax Support for Laboratories.* A great many people go to the hospital to get additional laboratory data and x-ray diagnoses. The personnel and facilities needed to do this work could be put in charge of the Massachusetts Medical Society, thus preventing political corruption, commercialism and favoritism from governing appointments. The establishment of additional laboratories, especially in the rural districts, would give definite help to those living there. They would help the doctor to practice better medicine, reduce hospital care and increase the efficiency of domiciliary service. These stations could be supported by local tax funds or by state or federal grants-in-aid, which might come under the scope of the present Social Security Act.

4. *Local Tax Support for Medical Care of the Indigent and Near-Indigent.* Such care should be financed by local taxation so far as possible, with state and federal aid under certain conditions and in certain communities. It has been a tradition in our profession to give poor people adequate medical care, irrespective of their ability to pay. This may be far from "adequate," a word about which we hear so much from the social scientist. "Adequate" care in one case may mean giving bread and milk; in another it may call for the most painstaking, detailed study. Most of the public have no conception of the amount of free care given to the indigent in hospitals, where everyone except the doctor and pupil nurse is paid, in outpatient departments, where many young doctors put in generous parts of their days without any thought of financial reward, and even in doctors' offices and patients' homes. The present Social Security Act, and most other compulsory insurance acts, do not reach this class of people. The help we give them is traditionally unorganized and hit-or-miss; if poor patients were to receive more organized and definite aid much could be done to benefit them.

5. *Establishment of a Federal Co-ordinating Authority.* At present some health work is under the guidance of the United States Public Health Service, a branch of the Treasury Department, and some is under the Children's Bureau of the Department of Labor. Instead, it should be centered in a Department of Health, with a medical Secretary of Health, who would be a cabinet officer. We could then attack these problems along broad lines, with good assurance of being able to raise the standard of medical practice and thereby improve public health.

In presenting these plans we must recognize the rapidly changing nature of medical science and avoid any standardization of mediocrity. With federal funds the standards of medical education can be raised and the results of medical research can be made available to many more people. If such steps as I have suggested are not taken by the medical profession itself, we shall find ourselves confronted by a *fait accompli,* having had no voice in the matter and with only ourselves to blame for the result. This is no time for a laissez-faire attitude. We must overcome our lethargy, educate ourselves as to what should be done, and follow through with united front to bring about such legislation as will be fair to both the practitioner and the public.

21 West Street.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 24051

PRESENTATION OF CASE

A forty-five-year-old Canadian born farmer entered the hospital with the complaint of pain in the right lower quadrant of a month's duration.

He had always been in good health up to a month before entry, when he first had a feeling of "gas" in the lower part of his abdomen. Three weeks before entry he could feel a firm, somewhat tender lump, measuring about 5 cm. in diameter, in his right lower quadrant. He also had dull nonradiating pain in his right lower quadrant which at first was so mild that he forgot about it when he was busy. The pain came on in attacks which occurred daily and lasted from a few minutes to several hours. It bore no relation to urination, defecation or the eating of food, but was relieved by gaseous eructations and the passage of gas by rectum. The attacks of pain became slightly more severe during the two weeks before entry but never caused him very much distress. The tender lump in the right lower quadrant did not increase in size. He did not have bloody or tarry stools, diarrhea, nausea, vomiting, loss of appetite, loss of weight, or any other significant symptoms. During his illness he frequently took milk of magnesia and occasionally other cathartics for relief of the pain. This apparently had the effect of increasing his bowel movements from one to two per day.

His past history and family history were noncontributory.

Physical examination revealed a well-developed, poorly nourished man who was not acutely ill. His trachea appeared to be slightly deviated to the left and there was slight dulness and decreased tactile fremitus without rales at the apex of the left lung. His heart was negative, and his blood pressure was 130 systolic, 90 diastolic. In the right lower quadrant there was a firm, irregular mass measuring about 4 cm. in diameter which appeared to be fixed to the region of the brim of the pelvis. It was tender on its medial aspect. There was no other abdominal tenderness, spasm or rebound tenderness. The liver could be palpated three fingerbreadths below the costal margin, and its surface was smooth and non-tender.

The temperature was 98.6°F., the pulse 78. The respirations were 18.

The urine examination was negative. The blood showed a red-cell count of 4,900,000 with 70 per cent hemoglobin. The white-cell count was 8400 with 71 per cent polymorphonuclears. The blood Hinton test was negative.

A barium enema passed freely up to the cecum, where there was a constant filling defect involving the lower part of the cecum. There was a suggestion of slight irregularity of the mucosa of the cecum, and the appearance of this filling defect was that of intussusception. A very small amount of barium passed into the terminal ileum. A gastrointestinal x-ray examination by a motor meal showed a mass measuring about 5 cm. in diameter, involving the pole of the cecum. Overlying the mass there appeared to be transverse mucosal lines in the cecum having the appearance of intussusception. The terminal ileum for about 6 cm. from the ileocecal valve was narrowed and showed normal mucosa and peristalsis with no evidence of intrinsic disease. However, it was displaced upward by the mass in the cecum, and above it the ileum was somewhat dilated. In the region of the mass there was a small area of calcification measuring about 1 cm. in diameter.

On the sixth day a laparotomy was performed.

X-RAY INTERPRETATION

DR. AUBREY O. HAMPTON: We have a barium enema examination and a double contrast enema. Here is the mass that is described. In this picture you can see the defect in the cecum with the transverse folds of mucosa which look like intussusception. In all these pictures there is an area of calcification about the size and shape of the appendix and about 1.5 cm. in length. The calcification is in the center of the mass. The ileum is normal except for displacement. The chest is normal.

DR. ARTHUR W. ALLEN: Did they get the information that his trachea was drawn over to the left from the x-ray or from physical examination? Apparently they thought there was an old apical lesion on the left.

DR. HAMPTON: His trachea is in the midline on the film. He has some indefinite density in the first right interspace, but I do not see anything on the left side.

DR. ALLEN: Does the x-ray department make a definite diagnosis of intussusception in this case?

DR. HAMPTON: The tip of the cecum appears slightly infolded. The condition has not progressed to the point of intussusception of the ileocecal valve, rather just a little pushing in of the cecum, let us say. But even so this could be the beginning of intussusception. I do not know whether one could tell whether the tip of the cecum was pushed up or drawn in.

DR. ALLEN: Where is the 6 cm. of ileum that was narrowed? Can you point that region out?

DR. HAMPTON: It is not very narrow. There are normal mucosal folds through it. It is displaced rather than actually narrowed.

DR. ALLEN: Does this represent the hepatic flexure?

DR. HAMPTON: Yes; very low.

DIFFERENTIAL DIAGNOSIS

DR. ALLEN: There is so much said about intussusception in this case that we may infer that that is not what he has the matter with him. But it is a very interesting story which brings up a good many points of interest in differential diagnosis, and I think we must accept the history as it is given.

This man did not come down with any acute illness at the time of onset of discomfort. According to the history his pain was low abdominal pain from the beginning and was that of large-bowel disease. I think there are various possibilities that one might consider. In the first place we start with a palpable tumor in the right lower quadrant. The patient himself discovered this tumor and undoubtedly it excited his curiosity. There was some tenderness in the tumor to palpation, particularly on its medial aspect; but the size of the tumor apparently had not varied much from the time he first noticed it until admission to the hospital. The question of an old apical tuberculosis which has been brought out in the history would make one think of the possibility of tuberculosis in the region of his cecum to account for the filling defect and the tumor. On the other hand I think it would be unlikely for a man to have tuberculosis of the cecum to the point of a palpable mass without having had a longer story of malaise and fatigue and inability to work. His malnutrition may not have been a real one, although it is possible that he had limited his diet somewhat due to resulting discomfort, in spite of the fact that the story says otherwise.

If we are going to consider all the possibilities that might cause a tumefaction with intussusception in the region of the cecum, we of course think of various benign lesions, because most of the intussusceptions of the right side of the bowel are started by benign tumors of some sort, usually not in the lumen of the bowel but in the wall. A lipoma may form in the bowel wall and be the starting point of an intussusception. A lymph-node enlargement in the ileocecal mesentery may start such a lesion. A benign polyp is not an infrequent cause for intussusception in the bowel. And then of course we have the various malignant neoplasms. It is perfectly true that a man may have a considerable lesion in the cecum or ascending colon from which he has no symptoms until it intussuscepts, but when intussusception takes place he is apt to have complete obstruction; he comes in as a case of intestinal obstruction with a palpable tumor on the right side, and not until the intussusception is dislodged by a barium enema or by spontaneous reduction does the relief of temporary obstruction occur, and with this, relief of pain. The fact that this man had had only intermittent pain which was probably cramp-like in character, although it does not say so, means that he was not obstructed. Besides, his bowels moved twice each day with a little milk of magnesia; that, I believe, is the biggest argument against its being intussusception.

If we want to assume that it was not intussusception and argue from that standpoint, what are the causes of masses developing in the right lower quadrant? Of course the commonest cause is appendicitis. The onset of this story is very unlike appendicitis, but we all know that appendicitis may produce any form of abdominal pain and present the widest variations of symptomatology. He had had this difficulty for four weeks, so we may not be too perturbed by the fact that his white count was normal. One might also take into consideration the tenderness of the mass. It does not state whether the skin over it was red. Perhaps it was. It still could be a subacute or very small, low-grade appendix abscess which was well encapsulated and which could be palpated. It might have buried itself into the cecum in such a way as to account for this picture.

The calcification in the center of the mass makes one suspicious of tuberculosis. One can have a low-grade tuberculous process in the ileocecal region involving primarily the lymph nodes, in which calcification can take place, and perhaps there could be associated with that a superimposed acute or subacute inflammatory process, which in other nodes might go on to small-abscess formation and still have a calcified node nearby.

I think that this is not cancer, although I am not influenced by the fact that he has so little anemia. Many of the right-colon lesions are picked up early enough so that they have not caused anemia. I doubt if it is one of the bizarre diseases like leukemia, amebiasis or actinomycosis. I think it is a benign lesion, not cancer, and the choice lies between tuberculosis and an unusual form of appendix abscess. I should be inclined to say that because of lack of obstruction he did not have intussusception and that his tumefaction was due to some subacute inflammatory process. I should put as my first choice a tuberculous node with calcification and secondary infection of other nodes, and as second choice, some form of appendicitis.

Clinical Discussion

Dr. Richard H. Sweet: I operated on this patient, and we came to exactly the same conclusion before operation that Dr. Allen has reached. We felt that he had an inflammatory process, not a carcinomatous cecum. My preoperative diagnosis was tuberculosis of the cecum. This mass was not tender, but was exceedingly firm and fixed. It felt like carcinoma, but when we opened the abdomen, it was obvious that it was a chronic inflammatory lesion. The appendix was not visible except when the ileum was rolled over. It was somewhat adherent in the region of the mass, and one could see about 1.0 cm. of the dilated tip. The end of the cecum and the appendix region were involved in this inflammatory mass. There were a number, almost a handful, of immensely swollen lymph nodes in the mesentery in that region. It was impossible to free the mass from the underlying peritoneum. We did not know exactly what we were dealing with. We still felt that it was tuberculosis and proceeded with a right colectomy on that basis.

Dr. William B. Breed: I should like to ask Dr. Hampton if he could say definitely that this small area of increased density is not an area of calcification and that it is not an appendix with barium in it.

Dr. Hampton: When we first saw the area we thought it was barium, but it remains in all the films and does not have so much density as barium. It does not look like a tuberculous gland. It has the shape of the appendix, and the only thing that you can really attribute it to is a calcified fecalith in the appendix. I saw the film before I knew what happened to the patient and asked the examiner to write in his note that the process was a benign tumor of the appendix; I could not imagine anything else that would produce this picture.

Dr. Allen: You cannot see this mass in any shape or form similar to a calcified gland?

Dr. Hampton: No. I am sorry that I did not go into that more before you discussed it. It does not look like any type of calcification that one ordinarily sees.

Clinical Diagnosis

Tuberculosis of the cecum.

Dr. Allen's Diagnoses

1. Tuberculosis of the cecum without intussusception.
2. Subacute appendix abscess.

Anatomic Diagnoses

Subacute and chronic appendicitis without abscess.
Fecalith.

Pathological Discussion

Dr. Benjamin Castleman: The specimen that we received consisted of a portion of the ascending colon, the cecum, the appendix and a segment of terminal ileum. The appendix was at first scarcely recognizable since it was somewhat over 2.5 cm. in diameter and was almost buried in the wall of the cecum, lying beneath the serosa of the latter. Its gross aspect was therefore most suggestive of a tumor. After a plane of cleavage had been found and it was dissected free, it was evident that the appendix was about 7 cm. in length; its walls averaged a centimeter in thickness and its lumen was patent but contained a fecalith, which was proved to be opaque to x-rays.

Microscopic examination showed no evidence of neoplasm, of tuberculosis or of any specific inflammatory lesion. There was a marked infiltration of all layers of the wall with lymphocytes, plasma cells and a very rare eosinophil. There was some inflammatory edema but most of the thickening appeared to be due to fibroblastic proliferation. The regional lymph nodes, which were numerous and large, showed only an inflammatory hyperplasia.

This is one of the very few appendices we have ever seen in this laboratory which, in the opinion of all the staff, unquestionably warranted the diagnosis of chronic appendicitis. That there was at the time of removal, and had been for at least a month previously, progressive infection and inflammatory reaction seems certain from the microscopic picture. Cases of this sort, however, are far too rare to give any encouragement to the surgeon who still tries to rationalize himself into believing that chronic appendicitis is a justifiable clinical diagnosis.

CASE 24052

Presentation of Case

First Admission: A thirty-year-old white, male, Irish chauffeur entered the hospital for the first time with the complaint of pain in the left knee of two years' duration.

About two years before entry he noticed the onset of pain in the left knee. It was sharp and knifelike and came on in attacks lasting one or two days. During inclement weather the attacks lasted longer. These attacks gradually became more severe, but the pain never spread beyond the knee. About two months before entry he consulted a physician who advised Epsom-salt stupes. These seemed to increase the severity of the pain. One month before entry x-ray studies were made, and an apparent abscess over the upper third of the left tibia was incised and drained. The material obtained was submitted to a patholo-

gist who reported it to show a staphylococcal osteomyelitis. The wound closed in two weeks, but one week later was reopened by the physician; it had drained continuously during the week before entry.

His past history and family history were noncontributory. He denied ever having had venereal disease.

Physical examination revealed a well-developed, fairly well-nourished male in no distress. The physical examination was negative except for the left leg, which showed a discharging sinus about 2.5 cm. in length in an operative incision over the upper aspect of the tibia. The area around it was swollen and slightly tender. The knee was held in 30° flexion. Extension and flexion were possible but painful, and there were spasm and atrophy of the thigh muscles.

The temperature was 98°F., the pulse 90. The respirations were 20.

The urine examination was negative. The blood showed a hemoglobin of 70 per cent and a white-cell count varying between 11,000 and 18,000. The blood Hinton was reported negative three times.

An x-ray of the left tibia showed the upper third to have a mottled appearance due to numerous areas of increased density and irregular areas of decreased density. The cortex had a moth-eaten appearance, and there was a considerable amount of new-bone formation about the upper shaft. The changes were quite diffuse, extending from the cartilage surface downward and fading out in the midshaft. There was very little increase in the size of the bone. The changes appeared to involve both the medulla and the cortex. An x-ray of the chest was negative.

His chart remained flat, and on the ninth day the lesion was widely incised and packed with iodoform gauze. There was a collection of pus on the anterior surface of the tibia. The bone itself was very dense and stony hard, and the periosteum and superficial cortex were destroyed. Some of the necrotic bone was gouged out. Biopsies were taken which, on pathological examination, showed acute and chronic osteomyelitis. Cultures of the material showed staphylococci in the broth, but no growth on a blood-agar plate. He was discharged on the thirtieth day with his wound still draining.

Second Admission (one week later). During the interval, wet dressings were applied to his wound daily by the district nurse. On the day before re-entry a painful, red, hot swelling appeared just above the wound and increased rapidly in size.

Physical examination revealed the infrapatellar bursa to be red, tender, swollen and fluctuant. There was no lymphangitis or swollen nodes. The operative wound was open and necrotic bone could be seen at its base.

The temperature was 103°F., the pulse 95. The respirations were 28.

The urine examination was negative. The blood showed a white-cell count of 18,500.

On the day of entry the fluctuant area was incised, and a large pocket of pus was found which extended across the entire anterior surface of the tibia just above the upper end of the previous incision. The abscess was packed with iodoform gauze. Culture of the material showed no growth on a blood-agar plate. On the second day the temperature dropped to normal and remained there until discharge. An x-ray on the seventh day showed a large operative defect involving the shaft of the tibia. The amount of bone destruction had apparently increased somewhat. He was discharged on the ninth day.

Final Admission (two months later). For three weeks after discharge he was in good health and thought that his lesion was healing properly. However, at the end of that time, five weeks before re-entry, he began to have very severe pain in his left knee which at first occurred only at night and wakened him from his sleep. Often the pain radiated deep to the inner side of the thigh or down the lower leg to his foot where it was needle-like in character. About two weeks before re-entry the pain had become almost constant, both day and night. At that time he noticed a swelling over the patella which gradually extended around into the popliteal space. It was very hot, red and tender to deep pressure. The swelling around his operative wounds also increased in extent. The wounds had continued to drain pus ever since his last operation. His general health was good except for occasional toothaches. He had no fever or night sweats.

Physical examination showed a somewhat emaciated man. The left knee was very much swollen and held in 30° flexion. There was a large swelling below the left knee with a deep fissure in it, lined by apparent granulation tissue. The skin over the swelling did not seem inflamed. A movable, non-tender node measuring 2.5 by 2 cm. was palpable in the left groin.

The temperature was 99°F., the pulse 140. The respirations were 20.

The urine examination was negative. The blood showed a red-cell count of 4,200,000 with 80 per cent hemoglobin and a white-cell count of 14,000 with 64 per cent polymorphonuclears. The blood Hinton was again negative.

An x-ray of the leg showed a large, lobulated, soft-tissue mass surrounding the upper portion of the tibia and the knee joint. The operative defect was less sharply defined and appeared to be partially filled in by new bone. There was some peri-

osteal elevation along the borders of the shaft. X-rays of the chest and long bones were negative.

On the sixth day an operation was performed.

Differential Diagnosis

Dr. Grantley W. Taylor: Since this is obviously a bone problem I think we had better look at the x-rays before we start the discussion.

Dr. George W. Holmes: In the first film we see a lesion which involves the upper two thirds of the tibia. It apparently stops sharply at the joint surface. There is destruction of the cortex but not complete destruction. It seems to be infiltrated but not completely destroyed, and there is a moderate amount of periosteal reaction. In this film I see no definite soft-tissue tumor. A primary osteogenic tumor of bone with involvement to that extent would certainly be accompanied by soft-tissue tumor. Occasionally a Ewing's tumor, a reticulum-cell sarcoma or some other lymphomatous type of tumor, or, of course, metastatic tumor will present this picture. Even after the process had gone on for a considerable time and had been operated upon there was no involvement of the joint. Osteomyelitis does not always involve the joint, but a lesion with this duration and with this extent of bone involvement should, I think, involve the joint.

In this film you see a considerable soft-tissue shadow which is somewhat lobulated: distinctly more so than you would expect in an ordinary case of osteomyelitis. This process is too evenly distributed and the mottling too coarse for osteomyelitis. Furthermore, there is more involvement of the cortex and less of the periosteum than you would expect with chronic osteomyelitis.

Dr. Taylor: Dr. Holmes's remarks are very much more to the point than mine would have been in indicating that this is not a simple case of osteomyelitis. We have positive cultures, we have positive pathological examinations, we have a typical, clinical course, all of which indicate that the diagnosis of osteomyelitis was a logical one to account for at least part of the picture. There are several things that arise in the course of a review of the case which argue that it is not a simple osteomyelitis. First of all there is the fact that this patient began to have symptoms after he was twenty-eight years old and then of a rather mild degree with gradually increasing severity. Such a history is consistent with a Brodie-abscess type of osteomyelitis, which is not at all confirmed by the x-ray studies. This diffuse involvement of the upper end of the shaft is much more consistent with the type of osteomyelitis that sets in in young children before the epiphyses have united. A similar picture may obtain in the early stages of the infection. His chart and clinical picture at the time of entrance to the hospital did not warrant a diagnosis of osteomyelitis of the sort that is consistent with these x-ray findings. The patient was in fairly good condition; his pulse was not particularly elevated; his temperature was not markedly elevated; he had occasionally increased white counts. So we realize that he must have had an accompanying infection along with his primary lesion, whatever that was. As I have said, he also had a tumor, and the problem is to decide what sort of tumor.

Dr. Holmes has alluded to a few of the tumors which we ought to consider in a case of this sort. Osteogenic sarcoma accounts for the largest proportion of the primary bone tumors. Ewing's tumor is commoner in younger people. The lymphomatous tumors must also be considered. I have not mentioned any benign tumors. There is nothing about this picture which suggests the possibility of benign tumor. Dr. Codman shed light on this case the other day — not discussing this case, however. He said that only one bone may be involved in the early stage of Paget's disease but that the disease does not persist as a one-bone disease. If it does, then there is something wrong with the diagnosis. This patient came to the hospital before we routinely did blood-calcium studies and phosphatase determinations, so we do not have these findings to help or confuse the diagnosis.

The problem is, Which of the possible tumors are we dealing with? We have a process with destruction of bone, and a process with the formation of a good deal of new bone. We have something which looks almost like a pathologic fracture and which may have brought about the exacerbation of symptoms that brought him to the hospital. The rather rapid progress of this disease is of interest; namely, at the last admission he looked emaciated, whereas on the first admission, two months previously, he was a well-nourished and fairly healthy individual. The progress of the tumor itself is astonishingly rapid so far as the process in the soft tissue is concerned, and in the bone. With both Dr. Simmons and Dr. Codman present, I do not feel that I should venture to offer the last word on the diagnosis of bone tumors, but it is my impression that we are dealing with osteogenic sarcoma regardless of the fact that the x-ray picture is not typical. I should say that on the sixth day the tumor was explored for an adequate specimen for the pathological department and that amputation was carried out. I should also say that almost regardless of the nature of the tumor the prognosis was fairly poor.

DR. TRACY B. MALLORY: Have you any comment, Dr. Codman?

DR. ERNEST A. CODMAN: I did not come in in time to hear the story. The films suggest that the lesion is such a difficult one to diagnose that I should like to avoid any trouble. Do not believe what Dr. Taylor says. When he can diagnose a case, I probably can, and vice versa. But when we are both puzzled, the x-ray man will probably be puzzled and the pathologist also.

DR. MALLORY: Every bone-tumor patient in this hospital is an old friend of Dr. Simmons. He can tell us more about this patient than anyone else can.

DR. CHANNING C. SIMMONS: I know this case because I operated on the patient. I did not see him until the third admission, when he had a fungating ulcerating tumor, visible in the third x-ray film. We reviewed the x-rays, and Dr. Holmes changed his diagnosis, based on the earlier films, to tumor and osteomyelitis. In talking with Dr. Mallory, he was not sure the sections were merely osteomyelitis and thought there might be tumor as well. Therefore we amputated, and discovered it was a reticulum-cell sarcoma. The man is perfectly well, three and a half years later. It is one of those unusual tumors of the reticulum-cell type, which metastasize very late. Unquestionably it is failure to recognize this type of tumor which accounts for many of the so-called cures of osteogenic sarcoma.

PREOPERATIVE DIAGNOSIS

Ewing's tumor.

DR. TAYLOR'S DIAGNOSES

Osteogenic sarcoma.
Osteomyelitis (secondary).

ANATOMIC DIAGNOSIS

Reticulum-cell sarcoma.

PATHOLOGICAL DISCUSSION

DR. MALLORY: This is a type of tumor that Dr. Frederic Parker, Jr., at the Boston City Hospital deserves the credit for recognizing and describing. He has pointed out that it is a fairly common primary tumor of the bone, and as Dr. Simmons has said, the prognosis is relatively good compared with that of any other primary malignant tumor of bone. At the time when this case was biopsied and operated upon I was not recognizing this tumor, and I called it a Ewing tumor. It was not osteogenic sarcoma, nor did it look like lymphoma; I did not know what to call it. It was definitely not characteristic of Ewing's tumor, but for lack of anything better, that is what we put down. In reviewing the slides in subsequent years, it has become clear to all of us, and Dr. Parker has checked on the specimen, that it is a rather typical example of reticulum-cell sarcoma. There was, however, very extensive secondary inflammation, and the first biopsy was quite an unsatisfactory one. On a specimen similar to that removed at the second biopsy we should be able today to make a correct diagnosis.

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DEPARTMENT OF MENTAL DISEASES

During the past year a Recess Commission, appointed by Governor Hurley, has been examining the state mental hospitals with a view to ascertaining the merits and demerits of the system and of making such recommendations to the Governor and Legislature as would tend to improve the care of the patients and in general increase the efficiency of the hospitals in carrying out the purposes for which they were established. This commission appointed committees from the personnel of the state institutions and other psychiatrists of prominence to make reports to it on a variety of subjects connected with the various phases of hospital administration and care. These subcommittees reported to the commission and recently this body made a lengthy report to the Governor in which were incorporated its recommendations.

It is gratifying to note that the commission found that, on the whole, the administration of the state hospitals of Massachusetts was efficient and humane, and thus lived up to the traditional standard of this Commonwealth. Despite the recent cataclysm which removed from the service of Massachusetts several distinguished psychiatrists, they found that the morale of the institutions was good. research was going on in several places in a creditable manner, the patients were on the whole well cared for, and the superintendents and personnel of the institutions were men and women of standing. There were minor criticisms; these related generally to the executive work of the institutions.

The most important recommendation which the commission made was in regard to the central executive division in the Department of Mental Diseases. At present there is a paid commissioner and four unpaid associates. In addition to the unpaid commissioners there is one assistant commissioner and three assistants to the assistant commissioner who are men selected from the state hospital service and who are, so to speak, being groomed for superintendencies and other executive positions in the state service. This training is an important and valuable part of the set-up. It is proposed that three commissioners be appointed who are to be paid. The first executive would be a psychiatrist of at least seven years' experience and one who is a member of the American Board of Psychiatry and Neurology. Of the other two, one would be a physician, not necessarily a psychiatrist, and the other a person with civic and executive experience. This group of three would supplant the present unitary head and in general take over the powers of the boards of trustees of the various institutions, including the appointments of the entire medical personnel; the duties of the boards would be minor and supervisory rather than as at present collateral with the powers of the superintendents of the various institutions.

There are several things to be said in favor of and against the proposed changes. From the standpoint of efficiency it would seem better theoretically to have the superintendents appointed by the commissioners rather than by the boards of

trustees, since laymen are presumably not sufficiently well acquainted with the qualifications of a psychiatrist to make a selection for such an important office. There is, however, a serious danger in overcentralization of power, one which should be carefully weighed against the factor of efficiency. It is conceivable that a governor might, by obtaining ascendancy over the commissioners, make a clean sweep of every physician in the state-hospital service. Such abuse of power is not without precedent, even in Massachusetts. On the whole, there ought to be a factor of safety — a buffering power, so to speak — against the possibility of political interference. It has been quite common in several of the western states for a new governor to remove through the commissioner's office the superintendents of the state hospitals and many of the important officers so that no continuity in service and experience was possible. While the power of the trustees should be modified, there ought to be provision made so that they can exert the effect of a brake against any drastic moves initiated in the commissioners' office.

Insofar as the change from one commissioner to three is concerned, the advantage to be gained does not seem to be clear. If a board of three is to be appointed, it would seem advisable to have, in addition to a psychiatrist as the first executive, an engineer, who would look after all the construction and physical maintenance problems of the institutions, and a steward, who would supervise the housekeeping, as the other two commissioners. There is no reason to expect that a psychiatrist will be a good engineer and a good steward in addition to his capability of controlling the medical care of the twenty odd thousand institutional patients.

It would seem better to have a single commissioner — a psychiatrist of at least ten years' experience and a member of the American Board of Psychiatry and Neurology, whose previous career has shown executive ability. On his staff of assistant commissioners there should be a chief engineer and a chief steward, as well as the present group of younger psychiatrists who are being trained for the higher executive positions.

All in all, the Recess Commission is to be congratulated on its fidelity to the job which it undertook, and medical men may well feel that all is not lost in the state hospitals of Massachusetts and that a tradition of service and humanitarianism, pre-eminent in the country, is still being maintained irrespective of political eruptions and personal catastrophes.

SULFANILAMIDE AND GONORRHEA

PHYSICIANS who read *Science News Letter* for December 18, 1937, must have been astounded at the double column heading on page 388 proclaiming: "Gonorrhea Cured in Three Days by Sulfanilamide Treatment." The first paragraph reports Professor Alyea of Duke University as saying that of one hundred and fifty-eight patients so treated, four fifths "made these rapid recoveries."

Without having Professor Alyea's article for study, one is not in a position to criticize this statement. It may be said, however, that results even approximating these have not been obtained in this section of the country. Sulfanilamide gives promise of being a most useful drug in the treatment of gonorrhea; it is perhaps the nearest approach that we have to a specific remedy. Its use, even in relatively small doses (30 or 40 grains a day), will cause a cessation of discharge within a few days, but the absence of appreciable discharge does not necessarily mean that the infection has cleared up. Even at that time, gonococci in large numbers may be found in the mucoid secretion of the urethra, and after the discontinuance of sulfanilamide, purulent urethritis may develop again. We must acquire a much greater experience in the use of this drug before we can speak with certainty of its value in the management of gonococcal infections.

It is most unfortunate that results such as these quoted by *Science News Letter* are presented to the lay reader. For years social hygiene organizations have endeavored to build up in the public consciousness an appreciation of the serious nature of gonorrhea and of the necessity for adequate medical treatment until the infection is thoroughly eradicated. If the public is led to believe that the

disease is cured by a few tablets which can be purchased at any drugstore, not only will the respect for gonorrhea diminish, but many people will consider themselves cured when actually they are highly infectious. In the last paragraph of the article, reference is made to the serious complications that may result from sulfanilamide treatment; we fear that some readers may not read that far, or if they do, may disregard the warning.

Such publicity as this is misleading and dangerous, and may be the means of damning a really useful drug.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY

M. Fletcher Eades, M.D., *Secretary*
19 Bay State Road
Boston

Case History No. 57. Premature Separation of the Placenta

Mrs. H., a white, thirty-three-year-old woman in her second pregnancy, was eight months pregnant when admitted to the hospital at 10:30 a. m., December 3, 1934. She complained of abdominal pain, dizziness, blurred vision and vaginal bleeding of two and a half hours' duration. This pregnancy had been uneventful until November 23, when she experienced some lower abdominal pain, which disappeared in a few hours. Her ankles had begun to swell on November 29. Slight vaginal bleeding had occurred December 1, but there was no associated abdominal pain. The family physician had found a high unengaged fetal head; the edema of the ankles had increased and the hands had become puffy. Her physician was called on the morning of entry and noted marked bleeding from the vagina and a uterus of board-like consistence. At this time abdominal pain and uterine tenderness were marked and persistent. She had not experienced fetal motion since 6:00 a. m.

There was no family history of diabetes, tuberculosis, cardiorenal disease or malignancy. The patient's health had always been good. Her periods began at fourteen and had always been regular and of the twenty-eight-day cycle. She had had an uncomplicated pregnancy in 1920. Her last period started on March 24, making the expected date of confinement December 31.

On physical examination there was a generalized edema. The mucous membranes were pale. Her tongue was coated and pale. The lungs were normal. The heart was not enlarged, and there were no murmurs. Her blood pressure was 144 systolic, 110 diastolic; the pulse was 80 and exceedingly weak. The uterus was the size of a full-term intrauterine pregnancy and was of ligneous consistence; it was impossible to outline definitely the fetus. The fetal heart was not audible. Palpation of the uterus caused excruciating pain.

A catheter specimen of urine revealed a large trace of albumin and many finely granular and hyaline casts. Blood examination showed a count of 2,800,000 red-blood cells, with a hemoglobin of 58 per cent (Sahli). Blood typing and matching for transfusion were immediately carried out, and the patient was prepared for vaginal examination.

She was transferred to the operating room which was set up for a laparotomy as well as for pelvic examination. She was anesthetized with light gas-oxygen anesthesia. A sterile vaginal examination revealed that the head was high, but it could be pushed into the pelvis, a fact which showed there was no cephalopelvic disproportion. The cervix was soft and measured 1 cm. in thickness; the internal os was 1.5 cm. in diameter. There was no evidence of placenta previa. The fetal membranes were artificially ruptured, and as much amniotic fluid as possible was drained from the uterus. The amniotic fluid was clear. The lower uterine segment, cervix and vagina were tightly packed with nine yards of sterile 2-inch gauze. Thick perineal pads were applied to the vulva. Two many-tailed abdominal binders were tightly applied to the abdomen from above downward. A perineal binder was tightly applied over the perineal pads and fastened securely to the abdominal binder. A special sheet, 45 cm. wide, was then applied around the patient's abdomen at the level of the uterus and tightened from the side (Spanish windlass). Morphine sulfate (¼ gr.) was administered in the operating room.

The patient was returned to the labor room in fairly good condition at 12:30 p. m. The blood pressure was 135 systolic, pulse 88. At 1:00 p. m. she was given 0.13 cc. (2 minims) Pitocin intramuscularly; this was repeated every forty-five minutes for three doses. She was then given 0.2 cc. (3 min.) every forty-five minutes for three doses. Labor began at 1:30 p. m. and progressed normally. Morphine sulfate (1/6 gr.) was given at 1:30 p. m. Sodium amytal (6 gr.) was administered by rectum at 2:00 p. m. Throughout the labor the blood pressure remained between 135 and 142 systolic,

A series of selected case histories by members of the section will be published weekly.
Comments and questions by subscribers are solicited and will be discussed by members of the section.

pulse between 88 and 96. The cervix was fully dilated at 4:30 p. m. The pack was expelled at 5:00 p. m. and was followed by a stillborn infant weighing 5 lb., 12 oz. Upon delivery of the infant the placenta was immediately expelled, followed by 1200 cc. of blood with clots. The uterus continued to ooze slightly, but this was controlled by uterine tamponade. The blood pressure after delivery remained low. Because of the large blood loss, a transfusion of 500 cc. of citrated blood was given. The blood pressure then rose from 75 systolic to 130 systolic, 80 diastolic, and the pulse came down from 130 to 104. The uterus reacted well, and there was no staining through the pack. This was removed twenty-four hours later, following which the uterine flow was normal.

On December 6, three days after delivery, there were 2,500,000 red-blood cells per cu. mm., and the hemoglobin was 48 per cent. Urine examination showed a very slight trace of albumin and an occasional cast. On December 13 the phenolsulfonphthalein test showed 34 per cent excretion of the dye in two hours. Two days later the Mosenthal test revealed a variation of specific gravity during the day of from 1.010 to 1.013. The nonprotein nitrogen was 52 mg. per cent, and the blood pressure 140 systolic, 108 diastolic. On December 17 the hemoglobin was 74 per cent, red-blood-cell count 3,900,000—an improvement following iron plus dietary treatment. The urine showed the slightest possible trace of albumin and no casts.

She was discharged on the fourteenth postpartum day after having made an afebrile, uncomplicated convalescence except for slight subinvolution of the uterus.

Comment. This case illustrates the value of the conservative treatment of rupturing the membranes, packing the cervix and vagina, and applying a many-tailed bandage for fundal pressure, in the presence of a dead baby and placental separation. There is always the remote possibility that the uterus cannot contract after delivery, which may necessitate hysterectomy. While this is possible, it is not probable, and its frequency does not make the abdominal operation justifiable.

The use of small doses of Pitocin, or other drugs containing extracts of the posterior lobe of the pituitary gland, in cases that are being induced, has a distinct place in obstetrics. Its use should be limited to the hands of men who are trained in obstetrics. The size and frequency of the doses used in this case are open to criticism. Most men would use only 0.07 cc. (1 minim) and repeat only once.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning February 7:

BRISTOL NORTH

Thursday, February 10, at 4:00 p. m., at the Morton Hospital, Taunton. Subject: Differential Diagnosis of Scarlet Fever and Its Treatment. Instructor: Edwin H. Place. Arthur R. Crandell, *Chairman.*

BRISTOL SOUTH (New Bedford Section)

Friday, February 11, at 4:00 p. m., at St. Luke's Hospital, New Bedford. Subject: Prophylactic Measures in the Treatment of Measles. Instructor: R. Cannon Eley. Robert H. Goodwin and Howard P. Sawyer, *Chairmen.*

ESSEX SOUTH

Tuesday, February 8, at 4:00 p. m., in the Nurses' Home, Salem Hospital, Salem. Subject: Recent Advances in the Diagnosis and Treatment of Heart Disease. Instructor: Sylvester McGinn. Walter G. Phippen, *Chairman.*

MIDDLESEX EAST

Tuesday, February 8, at 4:00 p. m., at the Melrose Hospital, Melrose. Subject: The Use of Vitamins in Pediatric Practice. Instructor: Louis K. Diamond. Joseph H. Fay, *Chairman.*

MIDDLESEX NORTH

Friday, February 11, at 7:00 p. m., at St. John's Hospital, Lowell. Subject: Treatment of Burns. Instructor: Robert H. Aldrich. William S. Lawler, *Chairman.*

NORFOLK

Friday, February 11, at 8:30 p. m., at the Norwood Hospital, Norwood. Subject: Bleeding in the First Trimester of Pregnancy. Instructor: Raymond S. Titus. Hugo B. C. Riemer, *Chairman.*

NORFOLK SOUTH

Monday, February 7, at 8:30 p. m., at the Quincy City Hospital, Quincy. Subject: Complications in Obstetrics Illustrated by Case Histories. Instructor: Roy J. Heffernan. David L. Belding, *Chairman.*

PLYMOUTH

Tuesday, February 8, at 4:00 p. m., in the Rosa Field Nurses' Residence, Brockton Hospital (rear of hospital), Brockton. Subject: Pneumococcus Pneumonia and Serum Therapy. Instructor: Frederick T. Lord. Walter H. Pulsifer, *Chairman.*

WORCESTER (Milford Section)

Thursday, February 10, at 8:30 p. m., in the Nurses' Home of the Milford Hospital, Milford. Subject: The Use of Vitamins in Pediatric Practice. Instructor: Harold L. Higgins. Joseph Ashkins, *Chairman.*

WORCESTER NORTH

Friday, February 11, at 4:30 p. m., at the Burbank Hospital, Fitchburg. Subject: Complications in Obstetrics Illustrated by Case Histories. Instructor: Joseph W. O'Connor. Edward A. Adams, *Chairman*.

MISCELLANY

CONNECTICUT NEWS

Hartford Hospital to Enlarge

The Hartford Hospital plans to break ground this spring for its new power plant, the first step in a $2,500,000 construction program. Many gifts to this fund have been received recently, the largest single one being $100,000 from Mrs. Era C. Root, widow of Dr. Edward K. Root, for forty years a member of the Hartford Hospital staff. Mrs. Root gave another $100,000 to be held by the hospital as the Edward King Root Maintenance Fund, the income to be used for "current purposes" ot the institution.

The nursing department of the hospital has become "new-hospital conscious" and as a result has presented $400 to the executive committee. Included in this contributing group were the graduate-nurse staff, student nurses, training-school-office staff, ward helpers, orderlies, sewing and dressmaking departments, surgical supply department, waitresses, kitchen staff, and chambermaids and telephone operators in the nurses' residence. The superintendent of nurses expressed the hope that the gift would inspire other employees of the hospital, as well as the public, to do their share.

Controversy over Hartford Municipal Hospital

Mayor Spellacy, in his message to the Board of Aldermen on December 13, proposed that the Municipal Hospital be converted into an isolation hospital and that Hartford's indigent be hospitalized in the city's three privately endowed hospitals. This, the mayor stated, would save the city at least $150,000. Careful study of the problem has revealed that such a step would actually cost the city more money. It is a very real question whether the three private hospitals, as they stand today, could care for the indigent sick of the city. The Mayor has set everyone thinking, and the result will probably be further economies in the management of the Municipal Hospital.

Protection Against Hazard of Spray Coating

The application of lacquer by means of a spray gun is an important industrial operation. The material sprayed contains some pigments which are toxic and from 75 to 90 per cent by weight of solvents, diluents and thinners, all of which are toxic, some much more so than others. It has been found increasingly evident that this spraying process is not properly safeguarded, particularly when the work is intermittent as in garage and auto-repair shops.

Puerperal Mortality Drops

The deaths in Connecticut from puerperal diseases during the first ten months of 1937 were 57 as compared with 92 in the corresponding period of 1936. This decrease of 35 is most significant.

Dedication at Trinity College

In Trinity College Chapel on December 11 a carved pew end was unveiled as a tribute to Horace Wells, discoverer of anesthesia. The ceremonies were a feature of a special vesper service attended by members of the Horace Wells Club, the Hartford Medical and Dental societies and students of Trinity College. The date marked the anniversary of the day in 1844 on which Dr. Wells had Professor Colton, an itinerant lecturer on chemistry, administer nitrous oxide or "laughing gas" to him while he submitted to a dental operation at the hands of his friend Dr. Riggs. An address, outlining the scientific and historical aspects of the discovery of anesthesia, was made by Dr. Walter R. Steiner, librarian of the Hartford Medical Society Library.

The pew end contains three carved figures, a profile of Dr. Wells in the center, a figure of Aesculapius, Greek god of medicine, at the top, and a representation of St. Apollonia, aged martyr at Alexandria and patroness against toothache.

Annual Meeting of Hartford Medical Society

The Hartford Medical Society held its annual meeting on January 3. Dr. Edward J. Whalen succeeded Dr. Otto G. Wiedman as president. Dr. Howard W. Brayton was elected vice-president, and Dr. J. Raymond Glazier, secretary. Dr. Franklin L. Lawton was re-elected treasurer, and Dr. Walter R. Steiner, librarian. Dr. Wiedman was presented with an engraved gavel on behalf of the members of the society by Dr. Brainard. In his address the retiring president discussed the increasing frequency of psychoneuroses as a cause of economic loss.

Tufts College Medical School Alumni

The alumni of Tufts College Medical School in Hartford County met in Hartford on January 10. Dr. Sidney H. McPherson presided. Drs. Louis E. Phaneuf, Alonzo K. Paine, Charles A. Haney, and Dean A. Warren Stearns were guest speakers. Teams were organized to aid in raising $2,000,000 for a new medical building and endowment fund at Tufts.

Connecticut Delegates at Washington

Eight delegates attended the conference at Washington on better care for mothers and babies. This conference was called by the Children's Bureau and arranged through a planning committee including every organization from the American College of Surgeons to the Junior League. The Connecticut delegates were: Dr. Stanley H. Osborn, commissioner, State Department of Health; Dr. Martha L. Clifford, director, Bureau of Child Hygiene; Miss Hazel V. Dudley, R.N., director, Bureau of Public Health Nursing; Dr. Ira V. Hiscock, professor of public health, Yale University; Dr. Joseph I. Linde, Connecticut chairman, American Academy of Pediatrics; Dr. J. Harold Root, president, Hezekiah Beardsley Pediatric Club; and Dr. Robert M. Lewis, of New Haven.

Health Officers Appointed

Arthur J. Couture, M.D., has been appointed town health officer of Sterling for a term of four years.

George S. Lambert, M.D., has been appointed health officer for the borough of Danielson and acting health officer for the town of Killingly.

Deaths

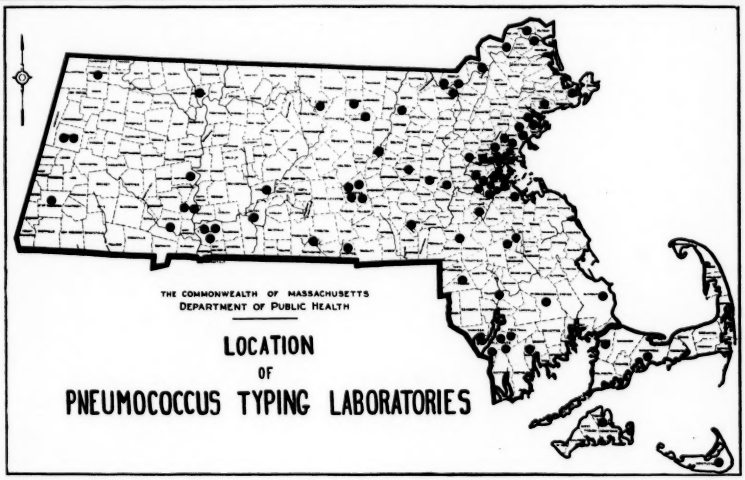
TENNEN — Joseph S. Tennen, M.D., forty-three, physician in Stamford for twelve years, died in the University of Michigan Hospital, Ann Arbor, Michigan, December 12,

after an illness of three weeks. He is survived by his widow, daughter, father and mother.

BOYCE — ROBERT V. BOYCE, M.D., forty-seven, former president of the Hartford Board of Health and a physician in the public schools, died of pneumonia at St. Francis Hospital on December 29. A native of Hartford, Dr. Boyce was a graduate of the University of Vermont College of Medicine and began general practice in Hartford following the World War. He was an obstetrician on the staff of St. Francis Hospital at the time of his death.

Dr. Boyce was vice-president of the first Hartford Board of Public Welfare, formed after the old Board of Charities was abolished. He was appointed to the health board in 1933 and in 1936 was unanimously elected its head. During the flood of March, 1936, Dr. Boyce, as president of the board, worked tirelessly to direct the city's precautionary measures to prevent spread of disease as a result of flood conditions. Under his direction inoculation of thousands of children and adults against typhoid fever was accomplished. In May, 1936, Dr. Boyce was named acting health officer of Hartford and in July of the same year resigned from the board at the expiration of his term as acting health officer. At the suggestion of Dr. Boyce the Division of Tuberculosis was added to the Hartford Board of Health in 1935, operating under the direction of a part-time physician. Dr. Boyce was a member of the Hartford, Hartford County and Connecticut State medical societies and the American Medical Association.

He was the son of the late Mr. and Mrs. Robert H. Boyce. His wife, the late Mary (Murray) Boyce, died in June, 1935. He leaves four children: William M. Boyce, a student at Connecticut State College; Mary Elizabeth Boyce; Helen Birchmans Boyce; and Robert V. Boyce, Jr. He also leaves a sister, Mrs. David Broderick, of Oak Park, Illinois.



CORRESPONDENCE

PNEUMOCOCCUS-TYPING
AND SERUM-DISTRIBUTION SERVICE

To the Editor: The Massachusetts Department of Public Health is glad to be able to announce that anti-pneumococcic serum for Type VII is now available throughout the State. Serum for Type V has been available since late in the spring, so that pneumonias caused by Types I, II, V and VII can now be treated with serum available from this department. Serum for Type VIII is in preparation, and it is hoped that a supply will be released in the near future.

The present plan is to have a monovalent Type I serum, a bivalent serum for treating cases due to Types II and V, and a bivalent serum for treating cases due to Types VII and VIII. During the next few months a certain amount of the serum available will be bivalent serum for treating Types I and II, but as soon as present supplies of this are exhausted, Type I will always be a monovalent serum.

Type I serum will be available at most of the approved typing laboratories throughout the State, as can be noted from the accompanying list. The supplies of the higher-type serums are not sufficient to warrant placing them in all these laboratories; consequently they will be found at a few strategically located points throughout the State, as noted on the accompanying list. When serum for Type VIII is available, it can be obtained from the latter stations.

The dosage recommended for uncomplicated cases of Type VII is from 60,000 to 90,000 units; this should be increased under conditions outlined in the circular which accompanies the serum. When Type VIII is available, the dosage recommended for uncomplicated cases is 100,000 units.

HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

State House,
Boston.

LABORATORIES FOR PNEUMOCOCCUS TYPING AND SERUM DISTRIBUTION

CITY OR TOWN	HOSPITAL OR DEPARTMENT OF HEALTH	TYPE OF THERAPEUTIC SERUM FOR DISTRIBUTION*
Amesbury	Amesbury Hospital	†
Attleboro	Sturdy Memorial Hospital	1
Ayer	Ayer Community Memorial Hospital	1
Beverly	Beverly Hospital	1, 2, 5, 7
Boston	Antitoxin and Vaccine Laboratory‡	1, 2, 5, 7
Boston	Beth Israel Hospital	1
Boston	Boston City Hospital	1, 2, 5, 7
Boston	Boston Dispensary	1
Boston	Carney Hospital	1
Boston	Faulkner Hospital	1, 2, 5, 7
Boston	Massachusetts General Hospital	1
Boston	Massachusetts Memorial Hospitals	1
Boston	New England Deaconess Hospital	1
Boston	Peter Bent Brigham Hospital	1
Boston (State House)	State Bacteriological Laboratory	1, 2, 5, 7
Boston	St. Elizabeth's Hospital	1
Brockton	Board of Health Laboratory	†
Brockton	Brockton Hospital	1, 2, 5, 7
Cambridge	Board of Health Laboratory	†
Cambridge	Cambridge City Hospital	1
Cambridge	Cambridge Hospital	1
Chelsea	Chelsea Memorial Hospital	1
Clinton	Clinton Hospital	1
Everett	Whidden Memorial Hospital	1
Fall River	Fall River General Hospital	1
Fall River	St. Anne's Hospital	1
Fall River	Truesdale Hospital	1
Fall River	Union Hospital	1
Fitchburg	Burbank Hospital	1, 2, 5, 7
Framingham	Framingham Union Hospital	1, 2, 5, 7
Gardner	Henry Heywood Memorial Hospital	1
Gloucester	Addison Gilbert Hospital	1
Great Barrington	Fairview Hospital	1
Greenfield	Franklin County Hospital	1, 2, 5, 7
Haverhill	Hale Hospital	1, 2, 5, 7
Holyoke	Holyoke Hospital	1
Holyoke	Providence Hospital	1, 2, 5, 7
Hyannis	Cape Cod Hospital	1, 2, 5, 7
Lawrence	Lawrence General Hospital	1
Leominster	Leominster Hospital	1
Lowell	Lowell General Hospital	1
Lowell	St. John's Hospital	1
Lowell	St. Joseph's Hospital	1, 2, 5, 7
Lynn	Lynn Hospital	1, 2, 5, 7
Lynn	Union Hospital	1
Malden	Malden Hospital	1
Marlboro	Marlboro Hospital	1
Melrose	Melrose Hospital	†
Middleboro	St. Luke's Hospital	1
Milford	Milford Hospital	1
Nantucket	Nantucket Cottage Hospital	1
Natick	Leonard Morse Hospital	1
New Bedford	St. Luke's Hospital	1, 2, 5, 7
Newburyport	Anna Jacques Hospital	1
Newton	Newton Hospital	1
Norfolk	Pondville State Hospital	1, 2, 5, 7
North Adams	North Adams Hospital	1
Northampton	Cooley Dickinson Hospital	1
Norwood	Norwood Hospital	1
Oak Bluffs	Martha's Vineyard Hospital	1
Palmer	Wing Memorial Hospital	1
Peabody	J. B. Thomas Hospital	1
Pittsfield	House of Mercy Hospital	1, 2, 5, 7
Pittsfield	St. Luke's Hospital	1
Plymouth	Jordan Hospital	1
Pocasset	Barnstable County Sanatorium	1
Quincy	Quincy City Hospital	1, 2, 5, 7
Salem	Salem Hospital	1
Somerville	Somerville Hospital	1
Southbridge	Harrington Memorial Hospital	1
Springfield	Springfield Hospital	1
Springfield	Mercy Hospital	1, 2, 5, 7
Springfield	Wesson Memorial Hospital	1
Taunton	Morton Hospital	1
Waltham	Waltham Hospital	1
Ware	Mary Lane Hospital	1
Webster	Webster Hospital	1
Westfield	Noble Hospital	1
Worcester	St. Vincent's Hospital	1
Worcester	Worcester City Hospital	1, 2, 5, 7
Worcester	Worcester Hahnemann Hospital	1
Worcester	Worcester Memorial Hospital	1

*Serum for Type VIII is in preparation, and, as soon as it is available, it can be obtained in the same laboratories as Types II, V and VII.

†Therapeutic serum is not available through this laboratory.

‡No typing done at this laboratory.

Additions to and changes in this list are made from time to time. Due to the high cost of the serum the number of distributing stations is kept as low as possible. At present Type-I serum is easily available in all parts of the State and serums for certain higher types are available at strategic points. The distribution of pneumococcus-antibody solutions is restricted to those hospitals, institutions or agencies equipped to do pneumococcus typing and employing bacteriologists or laboratory technicians who have been approved by the Department of Public Health as to their familiarity with typing procedures.

CORRECTION

In the January 27 issue of the *Journal* appeared a notice of the death of Dr. William Paris, of 139 Washington Avenue, Chelsea. Dr. Paris is very much alive, and the staff takes this opportunity of offering its apology for whatever inconvenience has resulted from the error.

RECENT DEATH

RESTALL — MALCOLM MORRIS RESTALL, M.D., of 66 Pleasant Street, Marblehead, died suddenly January 25 at his home. He was in his fortieth year.

Born in Everett he received his early education there, later attending Roxbury Latin School and graduating from Harvard University in 1922. He received his degree from the Harvard Medical School in 1926. After serving his internship at the Albany Hospital, Albany, New York, Dr. Restall established a practice in Marblehead. He was a staff member of the Salem Hospital and was also associated with the Mary Alley Hospital in Marblehead.

Dr. Restall was a fellow of the Massachusetts Medical Society and of the American Medical Association.

His widow, a daughter, his parents and a sister survive him.

REPORTS OF MEETINGS

HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on December 7, Dr. John Homans presiding.

The first case was presented from the medical service by Dr. Reifenstein. The patient was a 41-year-old clothing cutter. His past history was uneventful until somewhat over 2 years before entry when, while exercising strenuously, he had had a sudden attack consisting of a sensation of severe pressure under the midsternum. This sensation radiated to the shoulders, and down the arms as far as the elbows. It was accompanied by nausea, perspiration and a sense of malaise. He had been promptly treated with bed rest, morphine and nitroglycerin, and after a few days had been able to resume his former activities. He had then been well until a week before entry when he had had a similar but somewhat more severe attack. Two days before entry he developed left facial weakness, and also weakness of the left arm and leg. His systolic blood pressure which had been as high as 160 dropped to 110. Physical examination was not abnormal save for the paralyses. Laboratory data and the electrocardiogram were not remarkable. During his hospital stay of 16 days there had been a gradual diminution in the muscular weaknesses. Dr. Marshall Fulton pointed out that the patient was considered to have had a coronary thrombosis with a cerebral embolus originating from a mural thrombus.

The surgical case was presented by Dr. Hoerr. A 64-year-old Irish housewife had been perfectly well until 2 weeks before entry save for varicose veins which she had had since the age of 22. Two weeks before entry she had changed her home to an extremely "damp" locality, and at that time began to have pain and some swelling along the medial aspect of the left leg. This had persisted until the time of admission. Physical examination was not remarkable except for a series of tender hard lumps along the course of the left saphenous vein. Dr. Homans pointed out that this was the usual course of thrombosis in varicose veins. He gave a short discussion of the formation of thrombi. Appearing first as accumulations of platelets upon a vessel wall, these become matted together as a lamellated structure among the interstices of which white corpuscles adhere and a little fibrin is laid down. This is known as the white clot. When this clot becomes large enough to produce stasis, erythrocytes are deposited and the red clot is formed. There are several factors which predispose vessels to thrombosis. The first of these is trauma, infection or inflammation of a vessel wall or the tissues about the wall. Dr. Homans cited a case of "milk-leg" in which extensive inflammation was found around the pelvic vessels. Another cause of thrombosis is depletion of blood as after severe vomiting or diarrhea. Yet a third cause is slowing of the blood stream — a condition commonly found in relaxed, dependent limbs. Such causes tend to induce thrombosis in sites particularly favorable — especially the upper femoral and external iliac veins.

The paper of the evening was by Dr. C. H. Best, of the University of Toronto, who described experiments in the use of heparin in the prevention of thrombosis. Knowledge of heparin began in 1916 with the work of Howell upon the mechanism of blood clotting. Heparin has been shown to antagonize the action of thrombin and to some extent the action of prothrombin. Dr. Best also pointed out the importance of the work of the chemists at the University of Toronto and elsewhere, who had purified heparin sufficiently so that it could be produced in crystalline form. Describing his own work, he demonstrated three lines of experimentation. In the first, experimental thrombi were formed in the veins of animals by crushing the veins by the injection of a corrosive fluid (Soricin). Following this, some of the animals were treated with a constant intravenous infusion of saline in which crystalline heparin was dissolved. These animals showed much less tendency to form thrombi than did the controls; and if the original injury was not too great and if the treatment was kept up for several days, there even was healing of the vein. The second line of research consisted of microscopic examination of the changes in platelets in the process of forming thrombi. To illustrate this, Dr. Best showed motion pictures taken through oil-immersion lenses. In these the platelets could be seen settling on a glass surface, then sending out digitating processes along the surface, and finally undergoing degenerative changes and fusion. The third group of experiments made use of glass loops inserted into the veins of animals, for example, connecting the carotid and the jugular veins. Thrombus formation was observed in these loops, and motion pictures were shown to illustrate this. These showed the formation of the white thrombi and also the breaking away of these thrombi to form emboli. When heparin was introduced into the circulation these thrombi no longer formed, and those thrombi which had formed remained without further growth.

Dr. Best then spoke briefly of the application of these findings to the postoperative treatment of surgical patients who had undergone serious operations. Greatly diluted heparin was allowed to run into a peripheral vein, at a concentration aimed to keep the clotting time at 15 or 20 minutes, for a period beginning an hour or two after operation and lasting about 5 days. The result in the cases so far studied in Toronto has been entirely satisfactory.

HAMPSHIRE DISTRICT MEDICAL SOCIETY

A special meeting of the Hampshire District Medical Society was called on Tuesday evening, January 18, to act upon the resignation of Dr. Francis E. O'Brien as secretary-treasurer and to elect his successor.

It was voted to accept Dr. O'Brien's resignation. Dr. Joseph D. Collins was unanimously elected secretary-treasurer, his appointment becoming effective at that date.

BROOKFIELD MEDICAL CLUB

The January meeting of the Brookfield Medical Club was held at Ye Olde Tavern in West Brookfield on Wednesday, January 19, with Dr. Charles A. DeLand, of Warren, host, and Dr. John Fallon, of Worcester, guest speaker, his subject being "Observations on Recent Therapeutic Measures as Noted at the Mayo Clinic and Surgical Clinics in Chicago."

The February meeting will be held on the third Wednesday, with Dr. Joseph Slowick, of Palmer, as host.

J. R. Fowler, M.D., *Secretary.*

NOTICES

BOSTON TUBERCULOSIS ASSOCIATION

The annual meeting of the Boston Tuberculosis Association will be held at the Copley-Plaza Hotel, Copley Square, Boston, on Tuesday, February 15, at 4 p. m.

Dr. Henry F. Vaughan, commissioner, Department of Public Health, Detroit, Michigan, will be the speaker.

BOSTON UNIVERSITY MEDICAL SOCIETY

There will be a meeting of the Boston University Medical Society in the Evans Memorial Auditorium, 78 East Concord Street, Boston, on Monday evening, February 7, at 8 o'clock.

PROGRAM

Presentation of Case.

Observations on the Diagnosis and Treatment of Brain Tumors. Dr. Gilbert Horrax.

Medical students, nurses and physicians are cordially invited to attend.

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the hospital on Wednesday, February 9, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D., *Secretary*,
Medical Staff.

GEORGE WASHINGTON GAY LECTURE

The annual George Washington Gay lecture at Tufts College Medical School will be delivered by Dr. R. Nelson Hatt, of Springfield, on Thursday, March 3, at 4:00 p. m.

Physicians, students and others interested will be welcome.

DWIGHT O'HARA, M.D., *Vice-Dean*.

CUTTER LECTURE ON PREVENTIVE MEDICINE

The Cutter Lecture on Preventive Medicine will be given at the Harvard Medical School Amphitheater Building E, on Tuesday, February 15, at 5:00 p. m. Dr. Andrija Stampar, a member of the secretariat of the League of Nations, a delegate of the League of Nations to the National Economic Council of China, former director of health of Jugoslavia and professor extraordinarius for social hygiene in Zagreb, Jugoslavia, will speak on "Observations of a Rural Health Worker."

BOSTON DISPENSARY

25 Bennet Street, Boston
Lecture Hall, Second Floor, 9-10 a. m.

MEDICAL CONFERENCE PROGRAM, FEBRUARY, 1938

Friday, February 4 — Present Status of Sulfanilamide Therapy. Dr. Maurice A. Schnitker.
Saturday, February 5 — Recollections of Osler and Mackenzie. Dr. Joseph H. Pratt.
Tuesday, February 8 — Follow-up of Interesting Diagnostic Problems; Presentation of former patients in the Diagnostic Hospital. Dr. Heinrich G. Brugsch.
Wednesday, February 9 — Hospital Case Presentation. Dr. S. J. Thannhauser.
Thursday, February 10 — Social Service Case Presentation. Mrs. H. B. Hooker and Miss E. Grundy.
Friday, February 11 — Emotional Factors in Asthma. Dr. Felix Deutsch.
Saturday, February 12 — Hospital Case Presentation. Dr. S. J. Thannhauser.
Tuesday, February 15 — Clinicopathological Conference. Dr. R. C. Wadsworth.
Wednesday, February 16 — Hospital Case Presentation. Dr. S. J. Thannhauser.
Thursday, February 17 — Hyperventilation Syndromes. Dr. Maurice Sokolow.
Friday, February 18 — Some Recent Developments in Purpura and Hemophilia. Dr. Frederick J. Pohle.
Saturday, February 19 — Hospital Case Presentation. Dr. S. J. Thannhauser.
Wednesday, February 23 — Hospital Case Presentation. Dr. S. J. Thannhauser.
Thursday, February 24 — Gastrointestinal Clinic. Dr. K. S. Andrews.
Friday, February 25 — The Diagnosis of Multiple Myeloma. Dr. Bernard Jacobson.
Saturday, February 26 — Hospital Case Presentation. Dr. S. J. Thannhauser.

ALUMNI DAY — NEW YORK UNIVERSITY COLLEGE OF MEDICINE

All graduates of the New York University College of Medicine are cordially invited to participate in Alumni Day activities at the Medical College on Tuesday, February 22. As a fitting tribute to Dr. John Wyckoff, the Committee on Science and Education has arranged a comprehensive and attractive program on heart disease. There will be special exhibits and demonstrations to illustrate the papers presented.

A complimentary luncheon will be given by the Alumni Association in the Student Lounge, and the last official function will be an informal reception at which Dean Currier McEwen will be the host. Since many classes have arranged for reunions that evening, the annual association dinner has been cancelled.

MASSACHUSETTS PSYCHIATRIC SOCIETY

The Massachusetts Psychiatric Society will hold its next meeting at the Boston Psychopathic Hospital on Friday evening, February 25, at 8 o'clock. Dr. Ives Hendrick will speak on "The Contributions of Psychoanalysis to Psychiatry."

W. FRANKLIN WOOD, M.D., *Secretary*.

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, February 15, at 12 noon.

Dr. Dameshek will speak on "Hematological Problems in General Practice."

All physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary*.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance), Tuesday, February 8, at 8:15 p. m.

PROGRAM

Presentation of Cases.

The Aging of Some Homeostatic Mechanisms. Dr. Walter B. Cannon.

Medical students and physicians are cordially invited to attend.

MARSHALL N. FULTON, M.D., *Secretary*.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, FEBRUARY 7

MONDAY, FEBRUARY 7

*4 p. m. Physicians and medical students are cordially invited to attend a clinic presented by the medical, surgical and orthopedic services of the Infants' and Children's hospitals, in the amphitheater of the Children's Hospital.

TUESDAY, FEBRUARY 8

*9-10 a. m. Boston Dispensary. Follow-up of interesting diagnostic problems; presentation of former patients in the diagnostic hospital. Dr. Heinrich G. Brugsch.

*10 a. m. - 12:30 p. m. Tumor clinic. Boston Dispensary.

*8:15 p. m. Harvard Medical Society. Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance).

WEDNESDAY, FEBRUARY 9

*9-10 a. m. Boston Dispensary. Hospital case presentation. Dr. S. J. Thannhauser.

*12 m. Clinicopathological conference. Children's Hospital Amphitheater.

12 m. Boston City Hospital. Monthly clinicopathological conference. Pathological amphitheater.

THURSDAY, FEBRUARY 10

8:30-9:30 a. m. Exchange visit, surgical and orthopedic staffs of the Peter Bent Brigham and Children's hospitals, held this week at the Peter Bent Brigham Hospital.

*9-10 a. m. Boston Dispensary. Social service case presentation. Mrs. H. B. Hooker. Miss E. Grundy.

FRIDAY, FEBRUARY 11

*9-10 a. m. Boston Dispensary. Emotional Factors in Asthma. Dr. Felix Deutsch.

*10 a. m. - 12:30 p. m. Tumor clinic. Boston Dispensary.

SATURDAY, FEBRUARY 12

*9-10 a. m. Boston Dispensary. Hospital case presentation. Dr. S. J. Thannhauser.

*10 a. m. - 12 m. Staff rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

SUNDAY, FEBRUARY 13

4 p. m. Illustrated, public, health lecture, Faulkner Hospital auditorium. Stomach and Duodenal Ulcer. Dr. Edward S. Emery, Jr.

4 p. m. Free public lecture. Harvard Medical School, amphitheater of Building D. Menstrual Disorders and the Menopause. (For women only.) Dr. John Rock.

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*Open to the medical profession.

FEBRUARY 3 — Faulkner Hospital. Clinicopathological conference, 5 p. m.

FEBRUARY 4-26 — Boston Dispensary, Medical Conference Program. Page 245.

FEBRUARY 5 — Boston City Hospital, symposium on hepatic and biliary diseases. Page 203, issue of January 27.

FEBRUARY 7 — Boston University Medical Society. Page 245.

FEBRUARY 8 — Harvard Medical Society. Page 245.

FEBRUARY 9 — Boston City Hospital. Monthly clinicopathological conference. Page 245.

FEBRUARY 10 — Pentucket Association of Physicians. Hotel Bartlett, 95 Main Street, Haverhill, 8:30 p. m.

FEBRUARY 14 — American Board of Internal Medicine. Page 969, issue of December 9.

FEBRUARY 15 — Boston Tuberculosis Association. Page 244.

FEBRUARY 15 — Cutter Lecture on Preventive Medicine. Page 245.

FEBRUARY 15 — South End Medical Club. Page 245.

FEBRUARY 21 — Boston Medical History Club. 8:15 p. m., Boston Medical Library, 8 Fenway.

FEBRUARY 22 — New York University College of Medicine. Alumni Day. Page 245.

FEBRUARY 25 — Massachusetts Psychiatric Society. Page 245.

MARCH 1 — Greater Boston Medical Society. Beth Israel Hospital auditorium, 8:30 p. m.

MARCH 3 — George Washington Gay Lecture. Page 245.

MARCH 10, 11, 12 — New England Hospital Association. Page 51, issue of January 6.

APRIL 4-8 — The American College of Physicians. Page 41, issue of July 1.

MAY 31, JUNE 1 and 2 — Annual meeting of the Massachusetts Medical Society. Hotel Bradford, Boston.

JUNE 13-17 — American Medical Association. San Francisco.

OCTOBER 17-21 — Clinical Congress of the American College of Surgeons, New York City.

DISTRICT MEDICAL SOCIETIES

BRISTOL SOUTH

MAY 5 — 5 p. m., New Bedford.

ESSEX SOUTH

FEBRUARY 9 — Essex Sanatorium, Middleton. Clinic at 5 p. m. Dinner at 7 p. m. Speaker: Dr. John B. Hawes, 2d. Subject: Dust and Disease.

MARCH 2 — Lynn Hospital. Clinic at 5 p. m. Dinner at 7 p. m. Speaker and subject to be announced.

APRIL 6 — Gloucester Hospital, Gloucester. Clinic at 5 p. m. Dinner at 7 p. m. Speaker and subject to be announced.

MAY 5 — Censors meet at Salem Hospital, 3:30 p. m.

MAY 11 — Annual meeting, Salem Country Club, Peabody. Dinner at 7 p. m. Speaker and subject to be announced.

FRANKLIN

Meetings will be held at the Franklin County Hospital, Greenfield, at 11 a. m. the second Tuesdays of March and May.

HAMPDEN

Meetings will be held on the fourth Tuesday in April and July.

MIDDLESEX EAST

Meetings will be held at the Bear Hill Golf Club, Stoneham, at 12:15 p. m. on March 16, and May 11.

MIDDLESEX NORTH

Meeting will be held at the Vesper Country Club, Lowell, on April 27.

NORFOLK DISTRICT

FEBRUARY 23 — Hotel Kenmore. 8:15 p. m. Dermatitis Venenata Due to Cosmetics and Industrial Irritants. Dr. John G. Downing. Discussion by Dr. Francis P. McCarthy.

MARCH 29 — Hotel Kenmore. 8:15 p. m. Subject to be announced but to be related to diseases of the kidney. Dr. Albert A. Hornor.

MAY — Annual meeting.

The censors meet on the first Thursdays of May and November in each year.

NORFOLK SOUTH

Meetings held at 12 noon.

FEBRUARY 3 — Norfolk County Hospital, South Braintree.

MARCH 3 — Norfolk County Hospital, South Braintree.

APRIL 7 — At the Quincy City Hospital.

MAY 5 — Annual meeting.

PLYMOUTH

Meetings will be held at 11 a. m. on March 17, April 21, May 19 and July 21.

SUFFOLK

MARCH 15 — Joint meeting with Boston Obstetrical Society.

WORCESTER

At the following meetings, except the annual meeting, dinner will be at 6:15, to be followed by business session and scientific program.

FEBRUARY 9 — Worcester State Hospital, Worcester.

MARCH 9 — Memorial Hospital, Worcester.

APRIL 13 — Hahnemann Hospital, Worcester.

MAY 11 — Afternoon and evening, annual meeting. Place and schedule of program to be announced.

BOOKS RECEIVED FOR REVIEW

Modern Treatment in General Practice. Volume 3. Edited by Cecil P. G. Wakeley. 436 pp. Baltimore: William Wood & Company, 1937. $4.00.

Diathermy: Including diathermotherapy and other forms of medical and surgical electrothermic treatment. Elkin P. Cumberbatch. Third edition. 576 pp. Baltimore: William Wood & Company, 1937. $6.00.

Les Hépatites. Maurice Loeper. 262 pp. Paris: Masson et Cie, 1937. 60 Fr. fr.

Mentality and Homosexuality. Samuel Kahn. 249 pp. Boston: Meador Publishing Company, 1937. $3.00.

International Clinics. Edited by Louis Hamman. Volume 4. Forty-seventh Series. 343 pp. Philadelphia, Montreal, London: J. B. Lippincott Company, 1937. $3.00.

Surgical Pathology of the Diseases of the Neck. Arthur E. Hertzler. 237 pp. Philadelphia, Montreal and London: J. B. Lippincott Company, 1937. $5.00.

Les Explorations Fonctionnelles. Noël Fiessinger. 430 pp. Paris: Masson et Cie, 1937. 70 Fr. fr.

Apoplexies Viscérales Séreuses et Hémorragiques (Infarctus Viscéraux). Raymond Grégoire et Roger Couvelaire. 178 pp. Paris: Masson et Cie, 1937. 50 Fr. fr.

Les Acquisitions Nouvelles de l'Endocrinologie. R. Rivoire. Third edition. 264 pp. Paris: Masson et Cie, 1937. 45 Fr. fr.